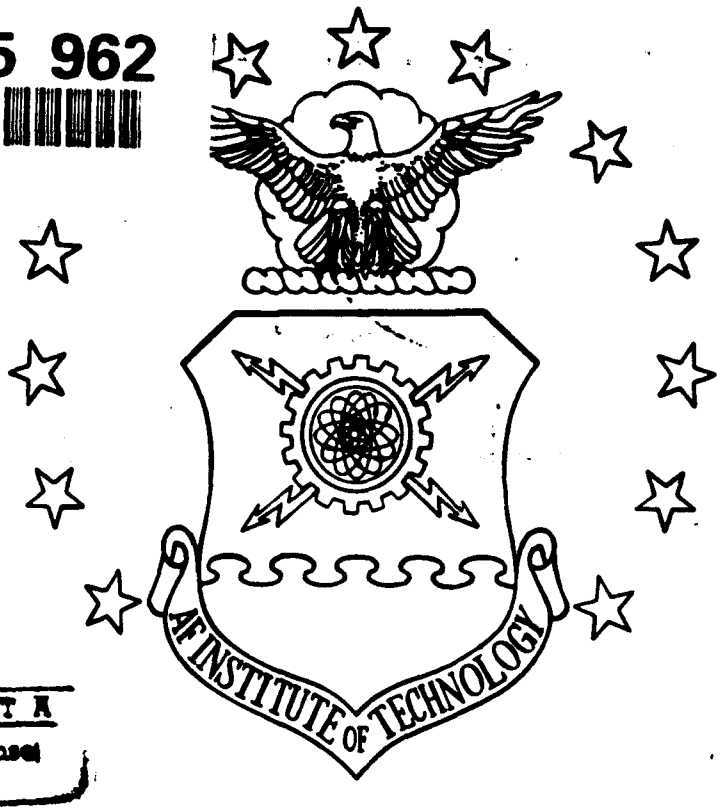

NIPARS: AN ANALYSIS OF PROCUREMENT PERFORMANCE AND COST FOR NONSTANDARD ITEMS

THESIS

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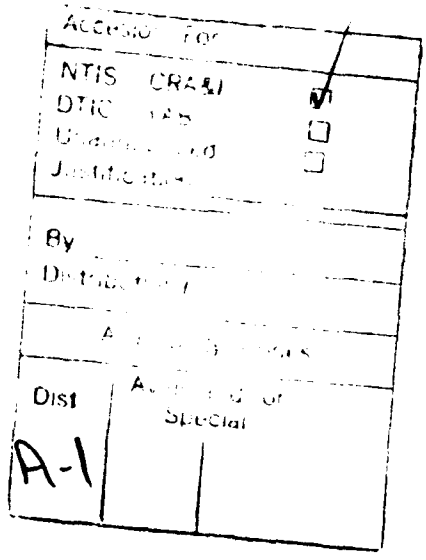

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THESIS

Presented to the Faculty of the School of Logistics and Acquisition Management of the Air Force Institute of Technology

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Susan J. Brown

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Abstract

In a world climate of declining defence budgets and contracting force structures, there is an increasing requirement for Australia to ensure value for money when undertaking defence purchases. Cognisant of this increasing financial pressure, the purpose of this thesis is to research the NIPARS program and determine the degree to which it provides Australia and other FMS customers value for money in the field of nonstandard parts procurement.

The research problem of this thesis was identified by the Royal Australian Airforce (RAAF) Supply Liaison Officer at WPAFB. The RAAF had participated in the NIPARS program for twelve months without feed back regarding the lead time and cost performance of the NIPARS program. This study analysed seven variables to asses the efficacy of NIPARS compared to previous methods used to provide nonstandard support; Procurement Administrative Lead Time, Production Lead Time, Total Procurement Lead Time, unit price, unit price inclusive of NIPARS charges and total unit price. The results of this analysis indicates that NIPARS lead time performance is superior; however, NIPARS unit cost performance is generally inferior to previous nonstandard procurement methods.

NIPARS: AN ANALYSIS OF PROCUREMENT PERFORMANCE AND COST FOR NONSTANDARD ITEMS

I. Introduction

Overview

This chapter provides some introductory background to the problem of nonstandard parts procurement, defines the purpose and constraints pertaining to this study, describes previous research of this problem and outlines the format of the research to be undertaken. Abbreviations employed in this study are defined at Appendix A.

Introduction

The defence of a nation's territorial boundaries is a central concern for most governments and ruling bodies throughout the world. A nation's economic wealth, its population, and its geographical location are important factors that influence a nation's ability to achieve it's defence objectives. The economic infrastructure and health of many nations are inadequate to maintain the military strength required to defend territorial boundaries from aggression; consequently, the burden to provide defence often falls upon major economic and military powers such as the United States of America (U.S.).

Providing security assistance to different countries throughout the world constitutes an important element in U.S. foreign policy. The U.S. Security Assistance Program provides essential military and economic aid through the administration of six component programs (DISAM, 1993:37). The only

component program that is relevant to the defence of Australia is the Foreign Military Sales (FMS) program.

Australia's participation in the U.S. FMS program can be traced back to 1966. This enduring defence arrangement permits the Australian Department of Defence to purchase weapon systems and defence services that would be otherwise unavailable. Australia is a security assistance customer that provides 100% payment for all defence purchases. Unlike neighboring Pacific nations, Australia does not participate in U.S. sponsored security assistance programs that provide military and economic aid; consequently, the financial burden of FMS purchases, on the annual defence budget is significant and must be managed efficiently. Resource managers are increasingly challenged to improve weapon system performance and capability with budgets that are declining. Effective repair and spares support is a central element in weapon system maintenance; however, this task is frequently complicated by FMS customers that operate systems that are not maintained in the U.S. Department of Defence (U.S. DoD) inventory. FMS customers look to the U.S. FMS program as a source through which to procure nonstandard items to support peculiar systems. This avenue has proven expensive and problematic in the past.

What is FMS?

FMS is a program authorised by the Arms Export Control Act, as amended, through which the U.S. government permits eligible foreign governments to purchase defence articles, services and training. FMS constitutes an important component of the US Security Assistance Program (DISAM, 1993:37).

FMS Case Defined. 'An FMS case . . . is a contractual sales agreement between the U.S. and an eligible foreign country or international organization' documented by a United States Department of Defence Letter of Offer and Acceptance (DISAM, 1993:557). An FMS case will normally be negotiated to formalize the procurement of discrete defence articles and services.

FMS Program Defined. Each U.S. Military Department (MILDEP) maintains an FMS program for eligible countries who have purchased defence articles and services. This program is managed at individual MILDEP organizational level and consists of a country's total number of open cases (DISAM, 1993:193). Within the U.S. Security Assistance Program there are six key component programs. They are the:

a. Foreign Military Sales (FMS) and Foreign Military Construction Sales Program;

b. Foreign Military Financing Program (FMFP);

c. Direct Commercial Sales (DCS) Licensed under the AECA;

d. International Military Education and Training Program (IMET);

e. Economic Support Fund (ESF); and,

f. Peacekeeping Operations (PKO) (DISAM, 1993:37-41).

Australia participates in two of these programs; they are, the FMS program and Commercial Sales Licensed under the AECA.

Why is Procurement of Nonstandard Items an Issue?

The Australian defence inventory is aging rapidly; consequently, weapon systems procured in the 1960s and 1970s are becoming increasingly difficult to support. For example, Australia procured the Caribou Aircraft in the 1960s and has continued to increase the life of the airframe beyond original expectations. This aircraft is no longer maintained in the U.S. DoD inventory; consequently,

the number of nonstandard parts procured for this system increases with time. In a climate of proliferating nonstandard systems, the establishment of a procurement channel for nonstandard items becomes increasingly important.

NIPARS. Sources that provided nonstandard parts such as the USAF Nonstandard Item Parts Acquisition and Repair System (NIPARS) program are important to maintaining a healthy Australian defence inventory. NIPARS is administered by a contract with a commercial procurement organisation that locates sources of NSI supply and manages item procurement and shipping.

Excess Defence Articles. Furthermore, the present draw down associated with the U.S. defence inventory is creating a number of bargain hunting opportunities for Excess Defence Articles (EDA). EDA applies collectively to U.S. defence articles that are no longer required by the U.S. armed forces. Such defence articles are made available for sale under the FMS program or as grant (no cost) transfers to eligible foreign countries. EDAs are priced on the basis of operating condition. They range from a high of 50 percent of procurement value to a low of 5 percent for equipment in need of repair (Samelson, 1992:111-12). Many FMS customers are taking advantage of the U.S. 'peace dividend' and updating and expanding their military capability through the procurement of EDA.

Capitalising on the reduction of the U.S. defence inventory, Australia recently acquired eighteen F111-G strike aircraft. In the long term, there is considerable potential for systems acquired during this force reduction phase to systematically undergo reduced follow on support as the U.S. DoD phases out weapon systems. As this occurs, an increasing number of standard items will become nonstandard. In light of Australia's recent acquisition of F111-G's,

access to an effective procurement system for nonstandard items becomes increasingly important.

NIPARS and the U.S. Defence Industry

> Industry projections point in one direction: while the United States controlled about 62 percent of the total non-communist world aero space markets in 1988, its share may drop to 53 percent by 2000 ... For U.S. firms to survive, let alone prosper, without reorganization or industry wide restructuring, they will have to make foreign sales a large part of their business. (Global Arms, 1991-2:55)

The U.S. DoD is undergoing the dramatic process of force reduction. An inescapable result of this process is that the U.S. defence industry will undergo a 'major transformation in the size and scope of its programs' (Clarke, 1990:11). Under these circumstances, U.S. defence business will naturally look to exports to take up some of the slack. In this context, NIPARS is an important initiative that shifts one element of spares and repair support away from the military arena and towards the commercial sector.

Security Assistance programs 'contribute to increasing the economic, political, and security posture of the U.S. in the emerging, new world' (Clarke, 1990:12). On the economic front, reduced defence business invariably affects the health of the U.S. defence industry. For example, defence production lines that are expensive to open up, close as defence spending by the U.S. government and FMS customer's contracts. A more serious impact of reduced sales in the defence industry is the invariable trickle down effect on industry profits. Reduced profit translates into reduced investment in research and development. NIPARS is a step to embrace commercial practices to service the nonstandard material requirements of FMS customers; however, the concept of NIPARS could extend further into more traditional military managed aspects of the FMS program.

NIPARS and the Logistics Concept

> The mission of logistics is to get the right goods or services to the right place, at the right time, and in the desired condition (Ballou, 1992:5).

In the context of Ballou's definition of logistics, the NIPARS program must be responsive to the customer's materiel and time constraints. NIPARS was designed to provide enhanced after market support for weapon systems and materiel no longer supported by the USAF. Of great concern to the FMS customer is procurement lead time. The time required to order and receive materiel is a critical element of the logistics process. The time taken to procure an item has associated costs; consequently, minimising procurement lead time minimises intangible weapon system costs.

The length of procurement lead time is uniformly recognised as an important element in the overall level of customer service provided. The length and variance in procurement lead time have a direct impact on inventory investment, demand forecast accuracy, inventory turbulence, safety stock levels, and weapon system responsiveness (Perry, 1990:15). In addition to procurement lead time, the cost aspect of procuring materiel and services is becoming increasingly important to FMS customers. The rising cost of weapons manufactured and designed in the U.S. is causing traditional customers to turn away from new systems and update existing systems that have been retired from the U.S. inventory. To adequately satisfy the customers needs, the NIPARS program must be capable of providing the required items within an acceptable time frame and at an acceptable cost. This may require the customer to make a tradeoff between unit cost and minimum lead time; however, the customer still requires that NIPARS provide value for money.

Past Research

In 1992, the performance of NIPARS was researched by Peter F. de KAM and Dorothy J. Tribble. The purpose of their research was to compare the time to cancel, PALT, Production Lead Time (PLT) and costs for nonstandard items acquired under NIPARS with those same performance metrics for previously used procedures. Furthermore, the researchers reviewed customer expectations and perceptions of the NIPARS process and its effect on the procurement of nonstandard items.

When de KAM and Tribble analysed measures of lead time performance, no attempt was made to match NSNs of orders placed under NIPARS to NSNs of orders procured via the FMS system. The problem with this method is that it permits different NSNs with different lead times to be compared. For example, the procurement of a nonstandard jet engine that requires reverse engineering is likely to have a longer procurement lead time and unit cost than a nonstandard flying glove. Comparing the lead time performance of these two items will be meaningless. Rather than comparing apples with oranges, this research will assess the performance of NIPARS by matching NSNs from both procurement systems. This method provides a level basis for comparison.

Although de KAM and Tribble did not match NSNs when analysing lead time, they did match NSNs to perform a comparison of the unit cost of NSIs. A significant conclusion drawn from the de KAM and Tribble research was that the prices of NIPARS procured items are less than the prices of nonstandard items procured using the FMS system. De KAM and Tribble matched 336 requisitions from both systems and compared the unit price and the total costs for each system. Total cost included unit cost and FMS charges for orders placed using the FMS system. For NIPARS, total cost included the unit cost and the

contractors fixed fee and award fee. Conflicting results were encountered when comparing unit costs; however, the researchers concluded that NIPARS performance was superior on this point (de KAM and Tribble, 1992:108). The analysis of unit price and total price differences between the two systems provided uncertain results from which the researchers concluded that NIPARS prices were lower than the prices of the FMS system. Unit price differences will be reanalysed in this study.

Specific Problem

> The message for the 1990's is unmistakable - the performance of the defence portfolio will increasingly be measured against the larger economic and social goals of Australia. Greater efficiency and effectiveness will rightly be expected from all areas of the organization (Hemsley, 1991:1).

The Minister for Defence, Senator Robert Ray, succinctly described the challenge that presently faces the Australian Department of Defence. Caught within a recessed national economy and facing a changing role as Australia's military goals shift, the ADF is increasingly changing shape and redefining its objectives to correspond with Australia's national interest. Participation in the United States Foreign Military Sales (FMS) program is an important avenue through which defence articles and services are acquired to permit our national defence objectives to be met.

In a world climate of declining defence budgets and contracting force structures, there is an increasing requirement for Australia to ensure value for money when undertaking defence purchases. Cognisant of this increasing financial pressure, the purpose of this thesis is to research the NIPARS program and determine the degree to which it provides Australia and other FMS customer's value for money in the field of nonstandard parts procurement.

Research Objectives

The objective of this research is to make a determination about the value of the NIPARS program to the Australian Department of Defence. That is, does NIPARS perform better for Australia than the standard FMS system for procuring NSIs? The variables of interest are:

a. Procurement Administrative Lead Time (PALT),

b. Production Lead Time (PLT),

c. Total Procurement Lead Time (TPLT),

d. unit price,

e. NIPARS price, and

f. total unit price.

Investigative Questions

Investigative Question I. Is there a difference between the average PALT for NSIs procured under NIPARS compared to NSIs procured by the standard FMS system?

Investigative Question II. Is there a difference between the average PLT for NSIs procured under NIPARS compared to NSIs procured by the standard FMS system?

Investigative Question III. Is there a difference between the average TPLT for NSIs procured under NIPARS compared to NSIs procured by the standard FMS system?

Investigative Question IV. Is there a difference between the average TPLT for Australian NSI requisitions procured under NIPARS compared to Australian NSI requisitions procured by the standard FMS system?

Investigative Question V. Is there a difference between the average unit price for NSIs procured by NIPARS compared to the average unit price of NSIs procured by the FMS system?

Investigative Question VI. Is there a difference between the average NIPARS price for NSIs procured by NIPARS compared to the average total unit price of NSIs procured by the FMS system?

Investigative Question VII. Is there a difference between the average total unit price for NSIs procured by NIPARS compared to the average total unit price of NSIs procured by the FMS system?

Investigative Question VIII. Is there a difference between the average NIPARS unit price for Australian NSI requisitions procured by NIPARS compared to the average total unit price of Australian NSI requisitions procured by the FMS system?

Investigative Question IX. Is there a difference between the average total unit price for Australian NSI requisitions procured by NIPARS compared to the average total unit price of Australian NSI requisitions procured by the FMS system?

Scope and Limitations

This research will focus on the procurement of nonstandard items for FMS customers and it will be limited to USAF programs only. Other DoD nonstandard item procurement programs, such as the Defence Logistics Agency Contractor Operated Parts Depot (COPAD), Army Nonstandard Acquisition Program (SNAP) and the Navy Simplified Acquisition (SIMPAC) program, will not be reviewed.

This study will analyse the performance of two systems for procuring nonstandard parts. These systems will be referred to as NIPARS and FMS. NIPARS is the present system used by FMS customers to procure NSIs. This system is administered by a commercial contractor and it has been fully operational since 1 January 1991. The system for comparison will be termed the FMS system and it refers to all NSI procurements prior to the implementation of NIPARS. Under the FMS system, Air Logistics Centres (ALCs) were responsible for satisfying FMS customer's NSI requirements. The majority of NSI procurement activity performed by ALCs ceased after 1 January 1991 (Brusky, 1993:1).

The scope of this study is limited to the procurement process within the FMS and NIPARS systems and does not consider lead time problems associated with shipping completed orders from the contractor to the FMS customer's freight forwarder. Additionally, this study does not account for peculiar problems that are associated with contingency operations.

Assumptions

This study has relied extensively on data provided by the Security Assistance Management Information System (SAMIS) and the NIPARS Management Information System; consequently, the researcher assumes that data gathered from these sources is accurate.

Furthermore, the researcher assumes that the NSI procurement environment for the NIPARS contractor is the same as it was for the FMS system. That is, the two systems encounter equivalent degrees of difficulty in administering NSI procurements.

Organisation of the Study

This study is organised into six major sections. Chapter I introduces the research by describing the purpose of the study. Chapter II summarises the evolution of the U.S. Government's Security Assistance program and the importance of FMS as a component of that program. Furthermore, the chapter outlines the history of nonstandard item procurement and provides some background to the evolution of the NIPARS program. Chapter III provides a detailed description of the NIPARS program and outlines the results of research that assesses the performance of NIPARS. Chapter III concludes with a summary of the present status of the NIPARS program.

Chapter IV details the methodology employed to conduct this research and Chapter V analyses the total lead time and cost performance of the NIPARS program. In conclusion, Chapter VI presents a discussion of the results and provides recommendations for further study.

II. Literature Review

Overview

The Foreign Military Sales (FMS) program that is authorised by the U.S. Arms Export Control Act is a major source through which Australia procures weapon systems and follow on support. The majority of activity that occurs in the FMS program pertains to the acquisition of systems, parts, maintenance and other services. The FMS program provides an alternative to commercial sources of supply; however, defence articles and services procured under this method are normally limited to weapon systems and defence services that are operated by the United States (U.S.) Defence Force. Some provision is made to procure items and services that are not standard to the U.S. Department of Defence (DoD) inventory. Procurement of support items and services that are nonstandard will form the basis of this research.

This chapter will provide a background to the evolution of FMS in the U.S. and provide a brief outline of Australia's participation as the program has evolved. The FMS supply process for standard items will be briefly addressed followed by a recent history of nonstandard part procurement. This review will give the audience a backdrop against which NIPARS (Nonstandard Item Part and Repair Support) evolved.

U.S. Security Assistance Program - Background

Evolution of U.S. Security Assistance.

> In the conduct of foreign relations, the United States, like every other state, is concerned primarily with the achievement of those objectives of national interest that it conceives to be of paramount significance. If the management of our external affairs is to enjoy rationality, it must have

> goals that harmonize with, and supplement, the internal policies and programs of the Government, whether they may be the promotion of commerce and trade, the acquisition of territory or power, or the maintenance of peace and security (DISAM, 1993:1).

This passage from President Truman's inaugural address, delivered to the nation in January 1949, provided the cornerstone upon which future foreign and security assistance policies would be developed. Many programs that collectively form U.S. security assistance evolved from this speech (DISAM, 1993:1).

The principle that has endured since Truman's speech is national interest; that is, U.S. foreign policy should be directed toward attaining goals that are commensurate with the national interest. This notion was evident in the political philosophies of the United States forefathers who embraced isolationist foreign policies to serve the national interest. Thomas Jefferson "advocated the cultivation of friendship with all nations and entangling alliances with none" (DISAM, 1993:1).

Through necessity, Truman's foreign policy position was a significant departure from early isolationist policies. In the shadow of two world wars and an increasingly industrialised economy, the United States faced a competitive and threatening world, a world upon which it relied for new economic markets and raw materials to sustain its manufacturing industries. The U.S. could no longer maintain a predominantly isolationist foreign policy. Accelerated by the catalyst of war and the encroaching nuclear age, new international relationships were forged and, before long, the U.S. became a world superpower (DISAM, 1993:2).

After World War II, the U.S.S.R. adopted an expansionist policy that extended international Communism beyond the borders of the U.S.S.R. In the wake of this activity, the U.S. national interest could no longer be served by

defending its territorial borders only. The national interest required that Communism be contained and to achieve this end, the U.S. developed a program of security assistance that provided direct military intervention and defence articles and services to allied nations. Security assistance is defined as a 'group of programs .... by which the United States provides defense articles, military training, and other defense related services, by grant, credit, cash sales, lease or loan in furtherance of national policies and objectives'(DISAM, 1993:585).

Since the end of World War II, the U.S. has been involved in more than 215 international incidents. Each event required the dispatch of U.S. forces to address situations that were construed as threatening to the political or economic interests of the U.S. More notable situations include Korea 1950, Suez 1956, Cuba 1962, Vietnam, Grenada 1983, Libya 1986, Panama 1989, and most recently, the Gulf War 1991 and Somalia (DISAM, 1993:2). Military intervention is not an element of the U.S security assistance policy; however, these examples provide evidence of the important role security assistance plays in the attainment of the U.S. national interest; important in that provision of security assistance to allied nations reduces the requirement for the U.S. to intervene militarily.

Security assistance serves the national interest by providing both human and material military resources to allies in times of political and economic crisis. The provision of security assistance furthers an ally's self sufficiency and reduces reliance on direct U.S. military assistance. Security assistance further enables allies to acquire and maintain sophisticated weapon systems to serve their own national interest. It has become 'one of the major tools for the projection of American influence throughout the world' (Clarke, 1990:10). The

forthcoming challenge in the security assistance arena is putting together assistance packages and FMS programs in ways that make security assistance more responsive to a changing world. The concept of NIPARS is a response to this challenge.

The primary philosophy upon which the present security assistance policy is constructed is a philosophy of self defence; that is, assisting allies to defend themselves 'will be more cost-effective than using U.S. military personnel and equipment to the same end' (DISAM, 1993:7). In short, the fundamental purpose of the Security Assistance Program is to complement and supplement the existing U.S. defense posture and contribute to the defence of useful alliances (DISAM,1993:5).

Current Security Assistance Policy. The current security assistance policy originated from the Truman Doctrine that evolved in the late 1940s. Today, U.S. security assistance policy is administered by two acts. They are: 1) the Foreign Assistance Act of 1961, as amended (FAA); and 2) the Arms Export Control Act of 1976, as amended (AECA) (DISAM, 1993:43). The FAA will not be examined further because it legislates on programs that are supplementary to the Security Assistance Program and is not relevant to Australia as a security assistance customer.

The AECA is the legislative instrument upon which the FMS program is managed. Sales of defence articles and services must comply with U.S. Government requirements, including that: 1) 'the furnishing of defense articles and defense services to such country or international organization will strengthen the security of the U.S. and promote world peace' (DSAA, 1990:Sec 202, 1); and 2) the 'FMS program must be managed at no cost to the USG (with

certain exceptions specifically covered by law), while (ensuring) prompt and complete service to the customer' (DSAA, 1990:Sec 202, 4).

Benefits of FMS. Considerable benefits accrue to Australia and to the U.S. Government through the administration of the FMS program. Reduced unit production costs resulting from increased order quantities yield economies for both governments. Furthermore, shared research and development costs also reduce total defence costs. Other mutual benefits derived from the present FMS program are improved standardisation and interoperability of weapon systems between the two defence departments and utilisation of Cooperative Logistics Supply Support Arrangements (CLSSA) (Clarke, 1990:10).

Modern day security assistance is deeply rooted in U.S. economic and military history. Its evolution stemmed from the formulation of foreign policy designed to serve the national interest. From the era of the Truman doctrine to the present, the U.S. Government's concern with preserving the national interest is no different than the purposes of other foreign governments. The U.S. Security Assistance program plays an important role in assisting Australia and other Pacific nations to serve their own national interests. Furthermore, the FMS program produces positive military and economic outcomes for the United States Government.

FMS Vs Commercial Sales. FMS guarantees single vendor integrity for the FMS customer. That is, the same parts will be provided over the life of the airframe (providing it is maintained in DoD inventory). Furthermore, the FMS customer takes advantage of U.S. acquisition regulations that control profit levels on defence contracts, and the FMS customer has access to defence stocks under CLSSA arrangements.

Direct commercial sales, on the other hand, provide the flexibility of company to company negotiations that may cut procurement lead time among other things. Furthermore, the supplier can tailor the defence article to the customers need (DISAM, 1991-2:62).

Themes in Security Assistance for the 1990s The U.S. Security Assistance program has advanced a number of themes to pursue into the 1990s. They are;

a. promotion of democratic values,

b. advancing the cause of peace,

c. economic progress at home and abroad,

d. countering transitional environmental and social changes (narcotics and terrorism), and

e. fostering global responsibility sharing (DISAM, 1991:9).

In the 1990s and into the year 2000, security assistance will be a more cost effective option to the U.S. government than using military power to the same end. Allied nations will be encouraged to absorb a greater share of the mutual defence burden by updating their weapon systems. Through Security Assistance programs, increased arms sales improves the international trade position of the U.S, creating employment for American workers and ultimately reducing unit cost of defence articles to the U.S. DoD and FMS customers (Blundell, 1990:26).

Australian Participation in FMS

Australia's participation in the U.S. Security Assistance Program dates back to 1966. Most of the Australian Defence Force's (ADF) inventory has its origins in FMS acquisitions undertaken during the 1970s and 1980s. The most significant acquisitions have been 75 F/A-18 tactical fighter aircraft for the Royal

Australian Air Force (RAAF) and frigates for the Royal Australian Navy (RAN). Australian foreign policies relating to self reliance are resulting in a reduction in FMS acquisitions. The Australian government is attempting to increase the Australian Defence Industry's (ADI) share of the defence market and an increasing number of defence requirements are being satisfied internally rather than through the FMS channel.

The formal basis for Australia's participation in the FMS program is the Cooperative Defence Logistic Support Agreement between the Australian and the U.S. governments. The most recent agreement was signed on 4 November 1989 and superseded similar agreements signed in 1985 and 1980 (Auditor General, 1992:2).

Impact of FMS Policy on Australia. The management of Australian acquisitions under the Foreign Military Sales program is significantly influenced by U.S. foreign policy principles designed to preserve the U.S. national interest. "Viewed from the US, Australia is just a little dot on a big screen ... a gnat easily swatted" (Wright, 1993:15). Constrained by this reality, the ability of Australia to exert influence over changing U.S. security assistance policies is limited; consequently, Australia constantly seeks channels through which to further her own economic and security interests within the present FMS system.

Foreign Military Sales Process

Principal FMS Players. The primary agencies involved in FMS administration are the Defence Security Assistance Agency (DSAA), the Defense Financial Accounting Service (DFAS), U.S. Army (USA), U.S. Navy (USN), U.S. Air Force (USAF) and the Defence Logistics Agency (DLA). DSAA provides policy oversight of the FMS program, DFAS provides financial coordination and

management services and the USA, USN, USAF and DLA are implementing agencies that initiate and administer procurement actions on behalf of FMS customers (DISAM, 1993:86-97).

Initiating FMS Procurement. The process for negotiating and implementing an FMS case can be very complex and varied. The initial request to procure defence articles is a Letter of Request (LOR) that is communicated through the U.S Embassy in the customer country to the cognisant U.S. Military Department. Information copies are also passed to DSAA, Unified Command and the Bureau of Politico-Military Affairs.

FMS Contract. After review and approval of the LOR, the responsible implementing agency will initiate a Letter of Offer and Acceptance (LOA). The LOA is the contractual instrument that specifies the nature of the defence articles or services to be provided, associated administrative expenses, and the cost of the articles or service. The LOA will further require the payment of a deposit prior to commencing any procurement activity. Once the LOA has been accepted by the customer and the deposit has been paid, the FMS case has been initiated and procurement activity may commence (DISAM, 1993:150).

Types of FMS Cases. There are three types of FMS cases that are formalised by a LOA. They are Blanket Order Cases, Defined Order Cases and Cooperative Logistic Supply Support Arrangements (CLSSA).

Blanket Order Cases. This case type designates a generic category of defence articles or services that may be procured; however, there is no definitive listing of items or quantities. A dollar ceiling is specified for a blanket order case and it is usually raised for one of the following purposes:

a. spares and repair parts;

b. publications;

c. support equipment;

d. minor modifications;

e. technical assistance services;

f. training;

g. training aid devices; and,

h. reparables (DISAM, 1993;184).

CLSSA Cases. These cases are used when a customer negotiates follow on support for a range of equipment associated with a major weapon system acquisition. The Foreign Military Sales Order I (FMSOI), 'covers the estimated dollar value of the total initial list of items and quantities to be stocked and maintained on order from procurement sources for the support of the customers U.S. furnished equipment' (DISAM, 1993:185). The FMSO II is a type of blanket order case that covers a customer's annual estimated withdrawals from U.S. DoD inventory. It is undefined in terms of quantities and specific items and reflects a dollar ceiling that indicates the customers expected demand (DISAM, 1993:185).

Defined Order Cases. Defined order cases are contracts for specific goods or services demanded by a customer. The customer's request generates a price and availability study by the U.S. implementing agency and the contract then reflects a specific price for a particular service or equipment. For example, missiles and technical services are usually provided by defined order cases (DISAM, 1993:183).

Order Processing. After the LOA is accepted and the deposit has been paid, the customer may commence ordering. The placement of a requisition formally advises material and service requirements to the appropriate implementing agency. There are two types of requisitioning processes. Push

requisitions are generated by U.S. implementing agencies to provide the customer with a service or item that forms part of an overall package. Publication orders are commonly filled through push requisitions. Pull requisitions are generated by the customer and are more commonly used by the Australian Defence Force. In this instance, the customer specifies the item, quantity and priority of the requisition.

Standard Item Support. Requisitions reported to implementing agencies generally request supply of items that are standard in the U.S. DoD inventory. That is, they are articles that are regularly used and purchased by the U.S. DoD. Requisitions of this nature are satisfied directly from DoD stocks or as a part of a broader defence purchase of the item.

Nonstandard Item Support. Nonstandard items as they pertain to FMS are defined as 'any items or equipment not included in the U.S. DoD inventory or not purchased for regular use by DoD' (DISAM, 1993:339). Nonstandard items are also considered to be items installed on systems or equipment that makes the system configuration peculiar to that particular country and dissimilar to inventory in the U.S. DoD.

Nonstandard items enter the FMS system for a number of reasons:

a. the customer changes the original system design to improve mission performance and capability;

b. for security reasons, the U.S. may modify the design prior to sale; and,

c. obsolete items may be sold through disposal channels or become obsolete as systems undergo technological advancement (DISAM, 1993: 339).

Procurement of nonstandard items creates follow on support problems because there is usually no inventory control point or item manager specifically assigned to manage nonstandard items. Furthermore, nonstandard items must

be identified and a source of supply located. Consequently, manual procedures must be used to satisfy customer's nonstandard item demands. This process is a drain on the U.S. FMS procurement system and usually translates into increased replacement time and cost for the customer (Brusky, 1990:81).

In recent years, implementing agencies have established special procurement systems designed to provide commercial support for nonstandard items. These systems are:

a. U.S. Army, Simplified Nonstandard Acquisition Process (SNAP),

b. U.S. Navy, Simplified Acquisition (SIMPAC),

c. DLA, Contractor Operated Parts Depot (COPAD), and

d. U.S. Air Force, Nonstandard Item Parts and Repair Support (NIPARS) (DISAM, 1993:339).

These commercially contracted systems are used when a required item is no longer managed or available through normal FMS supply channels. The requirement is then referred to a contractor who is responsible for researching, identifying, and procuring the requested item.

Nonstandard Support in the USAF Managed FMS Program

Air Force Materiel Command (AFMC) is presently responsible for providing logistic support for aircraft and other weapon systems transferred to over fifty security assistance customers. Contained within this responsibility is the requirement to furnish supply and depot level maintenance support for approximately 1600 weapon systems that are no longer operated by the U.S. DoD. For example, the C-7 and C-130E that are operated by the RAAF are no longer operated by the U.S. DoD. Furthermore, Air Force Security Assistance Command (AFSAC) provides logistic support to unique foreign configurations of

systems operated by the U.S. DoD. Some examples of unique configurations include the F-4, F-16 and C-130 (Brusky, 1990:1).

To comply with the Arms Export Control Act, AFSAC can neither spend appropriated funds to replenish stocks nor establish inventory for items not used by U.S. DoD weapon systems. Prior to NIPARS, FMS customer requirements for NSIs were satisfied or canceled by Air Logistics Centres (ALC) that were administered by Air Force Logistics Command and the International Logistics Centre (now AFSAC). Upon receipt of requisitions, usually low value and low quantity, one of five ALCs would initiate the purchase. Some NSI requisitions are filled from DoD stocks because AFSAC still retains some residual stocks of retired or redundant weapon systems (Brusky, 1990:1).

Scope. In 1988, the International Logistics Centre (ILC) was receiving approximately 25,000 NSI requisitions annually. Some 40 percent of these requisitions were identified by part number alone while the remainder were identified by NSN. Consequently, the identification process is complicated in a system designed around procurement based on NSNs.

Figure 1 outlines the FMS systems processing performance in filling NSI requisitions. This illustration indicates a clear requirement for improvement in processing NSIs. For example, 25,147 requisitions were analysed and 3,359 requisitions with an NSN had no action taken in a nine month period and approximately 3,371 were canceled without locating a source of supply. Only 4,441 requisitions were satisfied immediately, while the remaining 4,900 were placed on backorder. From the 25,147 requisitions analysed, 9,076 were not identified by NSN. Only 299 were delivered from stock and 4,512 were canceled. A further 2,394 had no action taken in the previous nine months while the remaining 1871 were placed on backorder (Brusky, 1990:81). The

high proportion of canceled requisitions causes concern for the FMS customer because an alternate source of supply must be located by the customer if the order is to be satisfied.

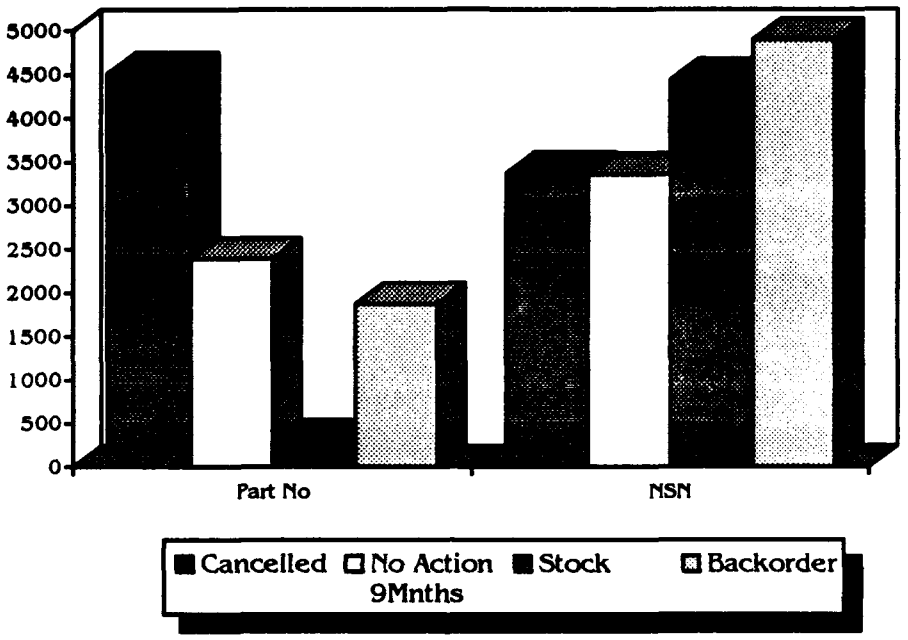

Figure 1. AFLC Performance in Filling NSI Requisitions in 1988 (Brusky and Burton, 1990/91:82)

USAF NSI Procurement Pre 1977

Overview. This section summarises the 1977 thesis by Major James D. Picard and Captain Michael J. Phalen titled 'Nonstandard Support Concepts in USAF Managed Security Assistance Programs'. All information in this section is derived from that thesis unless indicated otherwise. This section will identify the status of nonstandard concepts prior to and during 1977.

Background. In 1974 nonstandard support was identified as a potential problem. A Security Assistance Impact Study (SAIS) was initiated to evaluate the impact of Security Assistance on Air Force activities and it was the first major

study that predicted the impact that nonstandard support would have on USAF resources. Encouraged by the conclusions of this study, Major James D. Picard and Captain Michael J. Phalen undertook to document the evolution of nonstandard support policies. In their thesis, the researchers defined a nonstandard item as any item, with or without an NSN, which is neither managed or used by a U.S. DoD activity.

PEACE HAWK Program. In 1977, the policy pertaining to NSI procurement was contained in AFR 400-3 and stated that 'when directed by OSD, nonstandard equipment may be purchased and follow-on support provided' (Picard and Phalen, 1977:4). No standard policy existed and requirements for NSIs were treated on a case by case basis. The Royal Saudi Air Force (RSAF) PEACE HAWK program was developed in 1971. This program was one of the most extensive FMS programs managed by the USAF.

The RSAF PEACE HAWK program was initially established to procure 20 F-5B aircraft and support equipment. The original case (PEACE HAWK I) was formalised in 1971 and required the supply of both standard and nonstandard equipment. This program was the catalyst that focused attention on the inadequacies of existing NSI procurement procedures. Four months later, a second case (PEACE HAWK II) was negotiated to purchase 30 F-5E aircraft and support equipment. Together, the two cases involved six nonstandard systems that would require support for approximately 300 NSIs. In April 1972, the RSAF determined that they did not have sufficient maintenance capability to support the new systems; consequently, a third case (PEACE HAWK III) was formalised in August 1972. PEACE HAWK III required the USAF to enter a contract with the F-5 manufacturer (Northrop Aircraft Division) to provide maintenance, training

and facility construction to support the aircraft procured under the Peace Hawk I and II cases.

After negotiation of the third case, CSAF directed that follow on support for NSIs would only continue until the Peace Hawk program was concluded in February 1976; however, to address the programs interim NSI requirements, a nonstandard FMS case was established in July 1973. This case provided a Contractor Operated Depot (CONDEPOT) which would satisfy the NSI requirements of the program and function in the same way as the AFLC Depot Supply Support Program. A contract was negotiated with Northrop Aircraft Division (NAD) to provide the requested supply support in addition to engineering and technical support for engineering changes peculiar to the country's technical manuals and aircraft configuration. The contract cost $5.6M and covered 1,200 nonstandard line items and twelve systems (McLaughlin, 1985:42).

Material Support Under a Nonstandard Case. The CONDEPOT concept required that the contractor compute nonstandard materiel requirements to account for in-country stock, pipeline and CONDEPOT inventory levels. The inventory stored in Continental U.S. (CONUS) was maintained in a bonded warehouse by the contractor. The RSAF ordered NSIs directly from the CONDEPOT. After CONDEPOT commenced operation, the contractor advised the USAF that substantial economies could be achieved by utilising the standard USAF supply system to procure standard repair parts used to repair nonstandard equipment. In 1973, procedures were developed to permit the contractor to obtain standard repair items from the U.S. supply system using a standard RSAF FMS case. This arrangement permitted the contractor to maintain inventories of standard items that were acquired through the U.S. DoD supply system. The

supply system would ship the items to the RSAF freight forwarder who would then ship the items to the contractor. This inventory would then be used by the contractor to satisfy RSAF requisitions (de KAM and Tribble, 1992:19).

Extension of the RSAF NSI Program. As the PEACE HAWK program progressed, nonstandard items proliferated. At this time, the Chief of Staff, Air Force (CSAF) sought formal guidance pertaining to long term support of the high number of NSIs in the Peace Hawk program. In 1974, the RSAF requested a three year extension to the nonstandard support agreement negotiated in 1973. This request was approved by the U.S government as negotiations were undertaken for the PEACE HAWK IV sale of twenty F-5Fs, forty F-5Es, two simulators, an extensive aircraft update program and associated support equipment. This program added a further 7,000 nonstandard line items to the PEACE HAWK program. Negotiations also included extending the PEACE HAWK III construction, maintenance and training case to incorporate follow-on support for all 109 RSAF F-5s including nonstandard support.

Nonstandard Support Policy: The Early Stages. Nonstandard support in the security assistance world was identified as a potential problem by the Security Assistance Impact Study (SAIS) conducted in 1974. Motivated by the conclusions of this study, CSAF directed that the issues identified by the study be resolved. On 2 October 1975, AFLC presented three alternative nonstandard support policies;

1. Initial and follow on support for NSIs is negotiated between the FMS customer and the contractor using the direct commercial sales avenue with no AFLC involvement.

2. Limited AFLC involvement with maximum reliance upon the contractor to provide follow on nonstandard support.

3. Womb to tomb AFLC support for nonstandard items (Picard and Phalen, 1977:21).

Position two was recommended by AFLC. Under this concept, contractors were expected to operate as mini ALCs to provide nonstandard support to FMS customers. AFLC further recommended that the RSAF PEACE HAWK program be used as a pilot program to test implementation of the support concept. Air Staff approved the proposal on 6 October 1975; however, authority was not provided to exercise this concept on all nonstandard cases until written procedures were developed.

San Antonio ALC was directed to lead the way in developing nonstandard support procedures. This exercise was code named 'PACER GONDOLA' and it culminated in a set of draft Nonstandard Item Support System (NISS) instructions. The NISS instructions directed the USAF to negotiate contracts with private enterprise for logistics services associated with maintaining visibility, surveillance, and control of material from the acquisition phase through to delivery and follow on support phases. Additionally, the draft instructions required the FMS customer to accept a minimum service and further recognised that a tailored interface was fundamental to logistics support under the FMS program. This interface was necessary to ensure that the FMS customer's logistics system effectively functioned with the USAF system. To ensure adequate support for NSIs under this proposal, eight functions were identified that required tailoring to each country's particular requirements;

a. provisioning,

b. cataloging,

c. supply and maintenance,

d. technical orders,

e. material deficiency reporting,

f. configuration control,

g. engineering services, and

h. requirements computation.

The NISS program was scheduled to be implemented by June 1976; however, it was not implemented until August 1977 (McLaughlin, 1985:46).

Research Conclusions. The Picard and Phalen research effort was an initial attempt to define the problem of procuring nonstandard defence articles in the FMS program. This research consolidated FMS support issues and cases that highlighted the problem of supporting nonstandard systems. The researchers conclusions are reproduced in Table 1.

Table 1.

Summary of 1977 Thesis Conclusions

No	Conclusion
1.	Sales of nonstandard items would continue to increase.
2.	The USAF had unsuccessfully attempted to develop a nonstandard support policy since 1974.
3.	There was little effort by DoD, USAF or DSAA to reject or discourage FMS customer's requests for nonstandard items.
4.	There was no evidence to suggest that additional USAF workload was considered when directing USAF to provide nonstandard system support.
5.	Coordination between AFLC and AFSC was deficient when developing a nonstandard support concept and coordinating nonstandard system sales.
6.	There was a significant disparity in the handling of nonstandard support concepts.
7.	The issue of nonstandard item support was a symptom of the impending requirement that USAF operate as a vendor or supplier who in turn must subcontract for nonstandard supplies; and
8.	The uniqueness of each FMS case requires broad policy guidance in which flexibility can be exercised in response to the unique aspects of each case.

(McLaughlin, 1985:36-7)

USAF NSI Procurement Post 1977

Overview. This section summarises the 1985 thesis by Captain Kathleen McLaughlin titled 'Nonstandard Support In USAF Managed Security Assistance Programs: Policies and Implications, 1977-1985'. All information in this section is derived from that thesis unless indicated otherwise. For the purposes of clarity, verbatim quotations have been used to communicate the author's intent.

Background. The ensuing section traces the evolution of nonstandard support from the CONDEPOT and NISS systems to the Country Standard Item Support Program (CSIS). CONDEPOT was realised as a method of nonstandard support in the interim of Peace Hawk I through III. The transition to NISS was accomplished between Peace Hawk III and V, and on 20 January 1979, CSIS was implemented. As nonstandard support transitioned from CONDEPOT to NISS, the nonstandard line items supported by the USAF increased from 1,200 to 15,000 and systems increased from 12 to 26.

Nonstandard Item System Support (NISS). NISS was described as the 'vehicle for logistics support of material and services not available from DoD sources' (Mclaughlin, 1985:49); however, it applied only to RSAF Peace Hawk programs. NISS had evolved from the CONDEPOT support system and was providing supplies and services to the RSAF on a continuing basis. Prime variations between the CONDEPOT and NISS systems were;

a. NISS stocks were stored in country not in bond, and

b. NSNs were assigned to nonstandard items.

Northrop Aircraft Division (NAD) continued to perform the function of inventory manager which had previously been performed by a USAF ALC. Some of the functions performed by NAD included;

a. requisitioning and distribution,

b. procurement and manufacturing functions,

c. cataloguing functions,

d. overhaul, repair and modifications,

e. technical order maintenance, and

f. configuration status accounting.

Country Standard Item Support (CSIS). CSIS was similar to NISS; however, it expanded upon NISS by transferring a greater degree of responsibility to the contractor. Furthermore, it embraced a greater number of nonstandard sub systems. Under CSIS, the support requirements for nonstandard systems installed in RSAF F-5 aircraft and support systems were;

a. review, processing and surveillance of spares and repair orders,

b. labour, hardware, facilities and management for operation of nonstandard item overhaul and materials support,

c. secure warehousing for items awaiting overhaul and materials support, and

d. status and financial reporting.

Minor changes that characterised CSIS included;

a. Defence Supply centres screened items,

b. contractor authorisation to store spares in support of depot level repair and overhaul,

c. protection of the USAF Technical Order System from the introduction of country standard data, and

d. item screening prior to stock listing by DLA to insure that preferred items were not on hand in Defence Supply Centre inventory.

Controlled Multiple Address Letter (CMAL). To this point, all developments in nonstandard support policy pertained only to the RSAF Peace Hawk program. Although based on the Peace Hawk program, the NISS

procedures were eventually to be applied to all nonstandard support cases. However, the implementation of NISS slipped beyond the June 1976 implementation date resulting in the establishment of an AFLC Nonstandard Support Study Group known as the ad-hoc study group. The mandate of this group was to;

a. determine evaluation methods for nonstandard FMS requests, and

b. develop an optimum approach to support nonstandard configured systems.

The group recommended that nonstandard support be determined independently for each nonstandard configured system. This recommendation was accepted by the Chief of Staff AFLC on 17 August 1976. A series of controlled multiple address letters dictated nonstandard support policy in the late 1970s until the mid 1980s. They are summarised in table 2.

The NSIS was reviewed by the ILC in 1984. Working from the basis of CMAL 79-1, three initiatives were proposed to improve nonstandard support to FMS customers,

1. detailed procedures for processing part numbers were developed;

2. recommendation that the Customer Generated Nonstandard Requisition Guide (initially prepared to assist Turkey) be distributed to all FMS customers; and

3. an NSIS study group was formed with HQ AFLC, ILC and Chief of Air Staff Committee (CASC).

The first policy recommendation proposed by the NSIS study group pertained to changing the term nonstandard to FMS nonstocked. A discrepancy exists between de KAM's and Tribble's thesis and McLaughlin's thesis in that McLaughlin states that this recommendation was implemented; however, de KAM and Tribble state that it was not implemented.

Table 2

Controlled Multiple Address Letters - 1979 to 1985

CMAL	Purpose
CMAL 78-5	Provided prearranged contractual support for nonstandard systems by negotiating contracts with sub system vendors and letting contracts for spare parts procurement, depot level maintenance, T.O verification and validation, and technical services.
CMAL 79-1	Extended CMAL 78-5 providing support for provisioning, P & A studies, definitisation, cataloging, technical orders, engineering and technical services, follow on support item supply, depot repair, configuration accounting, and system activation manpower funding.
CMAL 82-1	CMAL 79-1 was extended annually and not incorporated into any applicable Air Force regulation consequently, CMAL 82-1 was designed to incorporate nonstandard support policies into permanent regulations. CMAL 82-1 was never implemented.

(McLaughlin, 1985:64-9)

De KAM and Tribble provide a more recent definition on this point quoting from the Air Force Supply manual 'an item (with or without a National Stock Number) which the DoD does *not actively manage* for its own use' (de KAM and Tribble, 1992:27).

The second recommendation proposed by the group and subsequently implemented pertained to the use of standard rather than unique source of supply codes for cataloguing nonstandard items. These recommendations have been incorporated into AFLC Regulation 72-2, Cataloging and Standardisation (de KAM and Tribble, 1992:27).

The third recommendation proposed applying the administrative surcharge to each requisition rather than requiring the establishment of nonstandard cases. This recommendation was rejected by SAAC and FMS customers continued to maintain both standard and nonstandard cases for follow on support. The administrative surcharge was assessed as 5% for nonstandard cases and 3% for standard cases.

Precursors to NIPARS. Other programs that were proposed to manage nonstandard support included the Consolidated Procurement Cycle Program and Contractor Logistics Support for Out-of-Inventory Weapons systems. The consolidated Procurement Cycle program was 'designed to consolidate all FMS nonstandard requisitions with low priorities ... for annual release to the source of supply' (de KAM and Tribble, 1992:28). The benefits expected from this program included smoothing the flow of nonstandard requisitions to the ALCs to permit ALC provisioners to generate purchase requests for larger quantities of items, and reducing unit cost to customers. This program was overtaken by the concept of NIPARS and was never implemented (de KAM and Tribble, 1992:28).

The Contractor Logistics Support for Out-of-Inventory Weapon Systems program paved the way for the implementation of NIPARS. This program was described by the USAF ILC Commander Brigadier Stuart Boyd as applying

> . . . solely to weapon systems no longer used by the DoD but which are provided to foreign governments through USAF Security Assistance programs. This program would transfer system program management, inventory management, and procurement responsibilities from ALCs to contractors (McLaughlin, 1985:87).

Conclusion

With each passing day, the United States of America plays an increasingly important role in the maintenance of world peace. The demise of the Union of Soviet Socialist Republics and the corresponding weakening of communist forces throughout the world increases the foreign policy and security assistance burdens of the U.S. This reality is exemplified by the major military deployment of U.S. troops and equipment during the Gulf War. The significant military mobilisation was inspired by the need to maintain stability in the volatile Middle

East. Apart from pursuing world peace, an important motive for the subsequent deployment was the need to serve and protect the U.S. National interest.

The Truman Doctrine marked the beginning of the United States role as a significant security assistance provider. The provision of defence articles and services to allied nations permits increased levels of self-sufficiency in defending territorial borders; consequently, placing less reliance on the U.S. to despatch forces to assist in security incidents.

Australia's reliance on the United States security assistance program is declining as major FMS projects are drawing to a close; however, the FMS program will continue to be an important acquisition source during this dynamic period of change.

From the PEACE HAWK I program through to the present, considerable effort has been expended designing a suitable nonstandard support program that minimises the impact on AFSAC resources yet provides the FMS customer with the desired level of nonstandard FMS support. The incremental steps taken in the path to NIPARS are summarised in Table 3.

Table 3.

History of Nonstandard Support Policies and Programs

Period	Concept	Major Theme
pre - 1971	None	Nonstandard support was provided on an ad hoc basis
1971 - 1976	CONDEPOT	Contractor provided most nonstandard support, to include warehousing in CONUS. Total package approach to support weapon system sale.
1976 - 1979	NISS	SA-ALC draft procedures (PACER GONDOLA) for contractor provided nonstandard support. Materiel storage in country. (Used only on Saudi programs). Aimed at total package support of all elements of ILS.
1979 - present	CSIS	Contractor supported program for RSAF. Increased contractor responsibility for nonstandard item management. Continued total package approach.
1978 - 1990	NSIS	Series of Controlled Multiple Address Letters (CMALs) prescribing AFLC policy on nonstandard support. Total package support addressed.
1990 - Present	NIPARS	Contract for nonstandard support via prime contractor and vendors. Applicable to all countries and almost all FMS cases. Concentrates on follow on logistics support with provisions for task orders to address other logistics support if required.

(de KAM and Tribble, 1992:17)

III. Nonstandard Item Parts Acquisition and Repair Support (NIPARS)

Overview

As outlined in the previous two sections, FMS support for nonstandard items is provided as part of a general commitment to support systems sold or transferred to FMS customers through the Security Assistance Program. The purpose of this chapter is to describe the present NIPARS system and to review the performance of NIPARS since implementation.

Introduction

AFMC 'is prohibited by law from using appropriated funds to establish inventory stocks of nonstandard items' (Brusky and Burton, 1990/91: 80). In the absence of residual DoD stocks, FMS customer's requirements must be satisfied by purchasing directly from vendors and manufacturers; however, identification of NSIs and location of a supply source constitute the major barriers to satisfying NSI requirements. The NIPARS program was initiated to overcome this problem; however, the program also includes two other services to FMS customers:

a. repair services, and

b. customised task order services.

Repair Services. Repair Services under the NIPARS contract became available on 1 September 1991. Since implementation, AFSAC has processed thousands of repair orders to the NIPARS contractor SCT (Systems Control Technology). The repair service provided by SCT includes locating and qualifying repair sources, providing price quotes and shipping instructions for items requiring repair and overhaul, providing advice to FMS customers of the

status of items undergoing repair, and returning the serviceable unit to customers after repair (International Logistics Centre, 1991: i).

Task Order Processing. The Task Order component of the NIPARS contract relates to the performance of studies, analysis and technical services. Expensive or unusual products such as turnkey systems that include specialised technical support, documentation and training are also included under the NIPARS Task Order Component (Systems Control Technology, 1991b: i).

The repair and task order components of the NIPARS program are important elements of the broader logistics support provided by FMS to foreign customers; however, the scope of this research and background study will be limited to supply processing of NSIs.

Program Objectives

In 1990, AFSAC implemented the NIPARS program to streamline the NSI procurement process and to improve NSI support. This program was formally named the Nonstandard Item Parts Acquisition and Repair System (NIPARS). The formal program objectives that are stated by AFSAC are to;

a. reduce the cancellation rate for NSI requisitions,

b. reduce procurement administrative lead time (PALT), and

c. reduce the workload associated with NSI procurement (Air Force, 1992: 1)

Evolution of NIPARS

AFLC prepared a Statement of Work (SOW) for a feasibility study of deactivated weapon system support in 1983. The study investigated the feasibility of re deploying the item management responsibility and system program management for redundant systems to the commercial sector. A

number of DoD and USAF organisations were approached to undertake the study; however, all declined the opportunity. In August 1984, funding was approved to solicit a commercial organisation to perform the study. The contract was awarded to MESA Corporation, Salt Lake City, Utah. The final report was submitted in May 1986, including a draft SOW to provide contract services for support of nonstandard items. In September 1986, a draft SOW was made available to contractors for comment. In December 1986, a second draft SOW that addressed contractors concerns, was released. The final SOW was approved on 28 April 1987 and a Request for Proposal was developed.

NIPARS Contractor and Sub Contractors

On 14 September 1990, Systems Control Technology Inc (SCT), of Palo Alto, California, was awarded the contract for NIPARS. As the prime contractor, SCT leads a team of five subcontractors in supporting the NIPARS program. This team consists of Peterson Builders, Inc. (PBI) of Sturgeon Bay Wisconsin and Charles V Clark Company, Inc. (CVC), Centerville, Ohio. These companies assist SCT in purchasing parts and supplies. Bahan Dennis, Inc. (BDI), Dayton, Ohio and United International Group, Inc. (UIG), Salt Lake City, Utah provide ALC Liaison support and contract administration support (Air Force, 1992:2)

SCT also provides and arranges for technical services, studies, analysis, and turnkey systems under the task order provisions of the NIPARS contract. These services are presently provided by KRUG International, Dayton, Ohio. The relationship of SCT to the five subcontractors is described in figure 2.

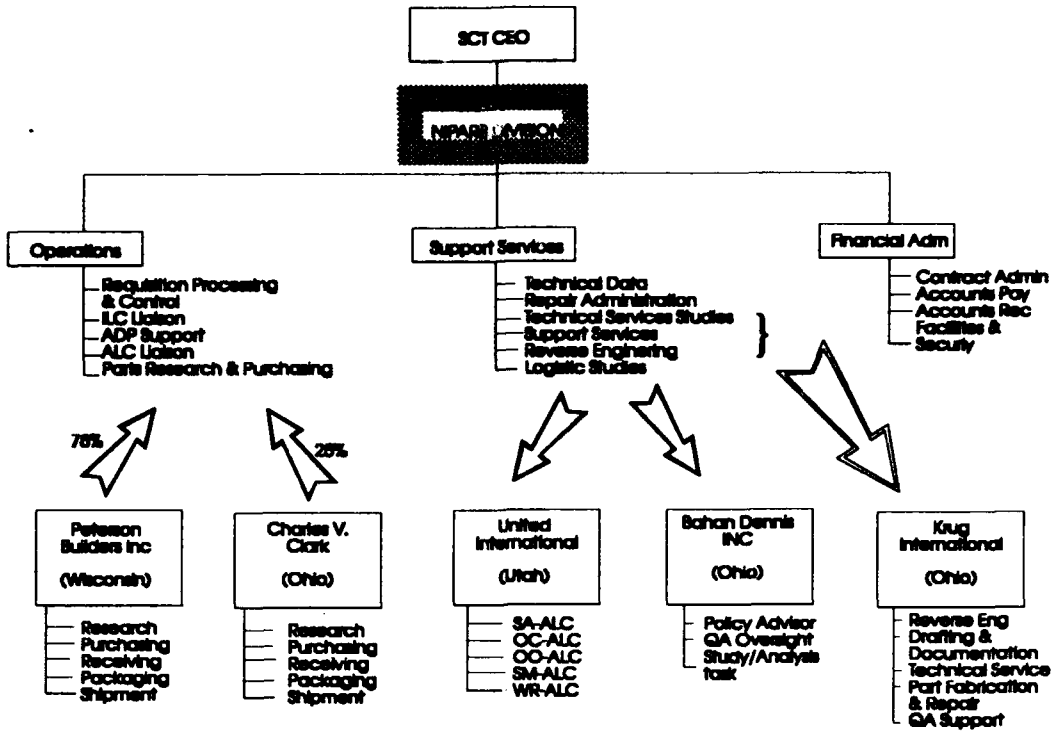

Figure 2: Functional Relationship Between NIPARS Team Members (Brusky and Burton, 1990/91:83)

Contract Overview

The NIPARS contract has a base period of two years with three option periods of one year each. The contract is currently in the first option year. The NIPARS contract simplifies nonstandard support for AFSAC and the FMS customer. The establishment of nonstandard FMS cases is no longer required because the 5% administrative surcharge for nonstandard procurements no longer applies. Rather, nonstandard items are charged the standard 3% administrative fee, a 3.1% logistics surcharge plus the 1.5% contract fee when nonstandard procurements are effected under NIPARS. This initiative permits NSIs to be requisitioned on standard CLSSA and Blanket Order cases (Charters, 1992:16).

Excluded Items. To comply with standard provisions for FMS procurement, a number of defence articles are prohibited from procurement under the NIPARS program. These items are:

a. ammunition,

b. explosive portions of cartridge and propellant actuated devices,

c. DoD centrally managed and procured items,

d. commercial items with no military application,

e. hazardous material, and

f. classified items (NIPARS, 1990:2-43,44).

Cancellation. Nonstandard items can be subject to significant cost increases due largely to high start up costs, retooling or reverse engineering when the item has been out of production for some time. Consequently, the quoted price for an item can vary significantly from the item's catalogue price. NIPARS gives the customer some visibility to these costs prior to formalising a nonstandard order. With the exception of Not Mission Capable Supply (NMCS) items, the NIPARS contractor is required to obtain customer's approval to proceed when the price quote significantly exceeds the customers reasonable expectations. The contractor must seek customer concurrence under the following circumstances;

a. 'the current quote value is between $2,500 and $10,000 and exceeds by 25% or more the last procurement price adjusted to reflect current year dollars,

b. the current quote value is greater than $10,000 and exceeds by 10% or more the last procurement price adjusted to reflect current year dollars,

c. the current quote is greater than $1,000 and 50% more of the requisition's cost is comprised of one-time start up charges

d. the current quote value is greater than $100,000', (NIPARS, 1990:2-51) and,

e. with effect 9 July 1992, requisitions valued less than $500.00. Requisitions with extended values less than $500 are routed by SAMIS to appropriate case managers who request customer concurrence. This prevents low value requisitions attracting a fixed fee that is greater than the requisition value. Consequently, the customer is afforded the opportunity to increase quantities to an economical amount or to cancel the requisition (Air Force, 1992:8).

Should the customers concurrence be required, 60 days is provided for the customer to advise SCT to proceed or cancel the order. If advice is not received in this period, the order is canceled and the appropriate cancellation fee is imposed (NIPARS, 1992:Modification 21). If the customer does not concur with the quoted price and chooses to cancel the order, a cancellation fee is levied on the customer to compensate SCT for the time and effort expended identifying the item, locating sources of supply and providing a price quote (Brusky and Burton, 1990:91). These fees are outlined in Table 4.

Table 4.

SCT Fee Schedule For Canceled Requisitions

NIPARS Contractor Cancellation Fees (Two Year Basic Contract)		
Requisition Sequence No.	Requisition Value	
	$0 - $2,500	$2,500 .01- $100,000
	Fee	Fee
1 - 10,000	$100.68	$161.05
10,001 - 20,000	$88.45	$148.77
20,001 - 30,000	$84.65	$146.13
30,001 - 40,000	$82.56	$143.19
40,001 - 50,000	$55.80	$86.56
50,001 - Completion	$48.38	$69.19
NIPARS Contractor Cancellation Fee (Two Option Years)		
Option Year	Requisition Value	
	$0 - $2,500	$2,500.01 - $100,000
1	$67.96	$108.03
2	$70.30	$112.14

(De KAM and Tribble, 1992:38)

To discourage abuse of NIPARS as a stock number research centre, a further fee associated with requisition cancellation, was built into the contract. This fee only applies when item research yields a stock number that is provided through standard FMS channels. In this instance, the requisition is canceled by SCT and referred back to AFSAC for provisioning action. The customer is charged a part number research fee that is not assessed in addition to a cancellation fee or fixed fee routinely associated with NIPARS administration of the order. These fees are outlined in Table 5.

Table 5.

SCT Fee Schedule for Part Number Research

Part Number Research Fees (Two Years Basic Contract)	
Requisition Sequence Number	Fee
1 - 10,000	$21.34
10,001 - 20,000	$20.47
20,001 - 30,000	$20.36
30,001 - 40,000	$19.83
40,001 - 50,000	$16.34
50,001 - Completion	$15.32
Part Number Research Fees (Option Years)	
Option Year	Fee
1	$18.06
2	$18.61

(de KAM and Tribble, 1992:39)

Payment to SCT. The NIPARS contract was awarded to SCT on a cost reimbursement basis with a fixed fee and award fee as remuneration for services received. A rather unusual element of this contract is the invoice payment clause of the contract. The U.S. treasury must forward payment to SCT by the later of;

a. 14th day after the designated billing office receives the invoice,

b. 14th day after government acceptance of supplies or services delivered.

If the designated billing office fails to comply with this requirement, "an interest penalty shall be paid automatically by the Government, without request from the contractor" (NIPARS, 1990:2-48). This contract provision significantly reduces the traditional lead times associated with contractor payment and also deviates from the prompt payment provisions contained in FAR 52.232-25 of February 1988 (NIPARS, 1990:2-47).

Materiel Quality. "The NIPARS contract requires that items are manaufactured under the essential elements of MIL-I-45208" (Air Force, 1992: 12). These elements include maintaining and calibrating test equipment, use of current and concise test procedures, recording inspection and test results and taking prompt corrective actions on deficiencies. To ensure compliance, a certificate of conformance is usually required for each item purchased under NIPARS. Furthermore, the NIPARS contractor and subcontractors are required to perform visual receiving inspections on NSIs. These inspections may be performed at the suppliers facilities to assure quality of parts and data.

Receipt and Inspection. The purchasing subcontractors, PBI and CVC, direct vendors to ship all items to their facility for inspection and acceptance. A visual quality inspection of material and packaging is performed prior to the preparation of final shipping documentation. Once inspection and shipping documentation is completed, the NIPARS subcontractors arrange delivery of the item to the customer's freight forwarder.

NIPARS Prices.

Fixed Fee. Rather than paying a percentage of materiel value to cover administration and processing charges, the customer pays a fixed fee per requisition for the contractors services. The fixed fee covers the following costs:

a. item research,

b. collection/preparation of technical data,

c. communication with customers and AFSAC,

d. vendor source location,

e. subcontract award/management,

f. quality assurance oversight,

g. item receipt, inspection, packaging, and shipping,

h. requisition status reporting (Brusky and Burton, 1990/91:88)

The fixed fee for each requisition processed is determined by the requisition value (regardless of volume) and the requisition block from which the order is assigned a requisition number. For example, an order that costs $500 and occurs in the requisition block numbered 1 - 10,000, will be charged a fixed fee of $108.80. An order placed later in time and requisition block sequence, will be charged a reducing fixed fee. The NIPARS fixed fee structure is outlined in Table 6.

Award Fee. Further to the fixed fee, the contractor may earn a quarterly award fee that is designed to motivate the contractor to provide superior performance. To establish a reserve from which this bonus is awarded, an additional charge is levied against each requisition processed by NIPARS. Table 7 outlines the structure of the award fee application.

Table 6.

NIPARS Fixed Fee Schedule

NIPARS Contractor Fixed Price For Services (Two Year Basic Contract Period)		
Requisition Sequence	Requisition Value	
	$0 - $2,500	$2,500 - 100,000
	Fee	Fee
1 - 10,000	$108.80	$332.40
10,001 - 20,000	$102.86	$314.38
20,001 - 30,000	$99.40	$303.54
30,001 - 40,000	$98.27	$299.12
40,001 - 50,000	$81.50	$171.16
50,001 - Completion	$76.68	$129.04
NIPARS Contractor Fixed Price For Services (Three Year Options)		
Option Year	Requisition Value	
	$0 - $2,500	$2,5001 - $100,000
1	$89.36	$222.07
2	$92.12	$229.98
3	$95.00	$238.21

(Brusky and Burton, 1990/91:88)

Table 7.

NIPARS Award Fee Schedule

Requisition Value	Award Fee Max
0.00 - 100	0.00
100.01 - 500	10.00
500.01 - 2,500	50.00
2,500.01 - 10,000	200.00
10,000.01 - 25,000	500.00
25,000.01 - 50,000	1,000.00
50,000.01 - 100,000	2,000.00
100,000.001 and above	4,000.00

(Charters, 1992:17)

When the NIPARS contractor submits the final bill for a requisition, an award fee based upon the value of the requisition, is added to the amount billed

to the FMS case. This award fee is held in a special award fee account that has been established in the Accounting and Finance Office at Wright Patterson Air Force Base. This office makes all payments to the contractor. The award fee is collectively held in the award fee account until it is paid to the contractor to reward superior performance (Brusky and Burton, 1990/91: 89).

Within five working days after the completion of each quarter, the contractor submits a performance report to the contracting officer summarising the contractor's performance for the evaluation period. Furthermore, AFSAC functional and technical advisors submit all information, recomendations and evaluations regarding contractor performance to the NIPARS program manager. The program manager consolidates all inputs including FMS customer's feed back and prepares an overall assessment of the contractor's performance as it relates to award fee criteria (discussed later in this chapter). This assessment is provided to the Award Review Board (ARB) along with any recommendations regarding the award fee amount.

Within seven working days after completion of the ARB, the ARB issues a report recomending an earned fee amount to the Fee Determining Officer (FDO) and the FDO issues a final determination regarding the award fee amount (NIPARS, 1990: Modification 20). Figure 3 indicates the awards that have been made to the contractor since the inception of the NIPARS program.

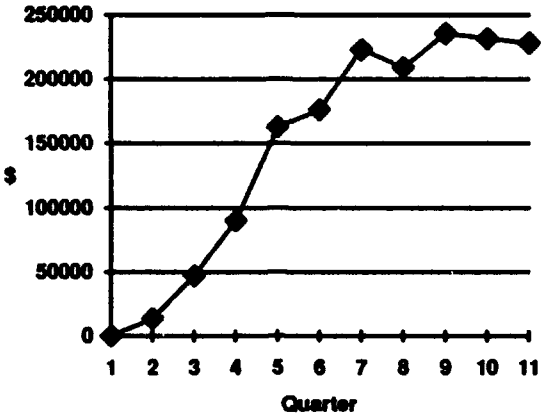

Figure 3: Awards to Contractor for Superior Performance (Thompson, 1993:1)

Payment of an award is subjectively determined based on the reported performance of the NIPARS contractor. To date, only a part of the award reserve has been paid to the contractor for superior performance. The residue is refunded to the FMS customer. Until March 1992, requisitions were charged the maximum permissable award fee; consequently, an excess of funds accumulated in the award fee account. Award fees since March 1992 are adjusted by the NIPARS program manager to suit the performance of the contractor (Thompson, 1993:1). The price data analysed in this study includes the maximum award fee for each requisition in the data set upto March 1992. For requisitions submitted after this date, the award fee varies between $0 and the maximum award fee. The award fee and fixed fee for each requisition analysed was provided by SAMIS and reflects the true NIPARS charges levied against each requisition.

A refund of award fee residue was made in December 1992 and the text of the official correspondence is reproduced.

> An audit of the non-standard item parts acquisition and repair system (NIPARS) revealed an excess amount of $330,000.00 had been collected for the award fee fund. This amount is being proportionately refunded to our customers.
>
> We made every effort to return the funds to the same country, case, line record from which the award fee was collected. We randomly chose document numbers appearing with the country, case, line to report the refund. These credits will appear on your next billing with 'award fee refund' in the stock number field (AFMC/AFSAC, 1992:1).

Total Price. The total unit FMS price of NSIs procured by ALCs consisted of the unit price, a 5% nonstandard administrative surcharge, 3.1% logistics support charge and 1.5% contract administration fee. In contrast, the total NIPARS price consists of a fixed fee, an award fee, 3% administration fee, 3.1% logistics support charge and 1.5% contract administration fee (Brusky, 1993b:1).

Quantity Discounts. A principal advantage associated with procuring through the FMS system is that the customer takes advantage of U.S. government prices, and reduced unit costs produced by discounts associated with large procurement quantities. Cognisant of this advantage, the NIPARS contractor attempts to reduce unit prices by consolidating customer requirements and initiating lot buys. According to the NIPARS manager, the program is successfully consolidating customer requirements and achieving appropriate economies (Miller, 1993:1).

Order Consolidation. SCT attempts to identify other users of a requested item and advise them to submit their requirements to AFSAC in order to obtain the discounted price. As requisitions are researched, they are grouped by identification codes of manufacturers and assigned priorities. The orders are then released to the buyer who is most familiar with the items required and the supplier (Air Force, 1992:7).

Lot Buys. The NIPARS contract was modified to permit lot buys to be undertaken. The modification permitted multiple line items to be procured

against a single document number. This arrangement is intended to permit 'consolidated procurement and shipment of initial spares packages of multiple, low value items at discounted processing fill fees' (Air Force, 1992:8). To qualify as a lot buy, requisitions must meet the following criteria:

a. all items must be available and purchased at one time and from a single supplier,

b. items must be staged for a single shipment, and

c. items are usually to be low value (Air Force, 1992: 8).

To process a lot buy, the country or case manager identifies a list of items that meet the general criteria for a lot buy requisition. A letter is forwarded to the NIPARS Program Management Office requesting a lot buy authorisation. The letter must include all part numbers, the manufacturer's cage code, name and address of the recomended supplier, quantity required and the estimated unit price of each item. A single document number is then assigned to the lot. The NIPARS Program Management Office coordinates the listing with SCT and authorises the case manager to enter the requisition in SAMIS as an A05 requisition with unit of issue as LT (Air Force, 1992:8).

Contractor Performance Measures.

An important element of the NIPARS contract pertains to the award of quarterly bonuses to the contractor based on performance for the preceding quarter. The award of the bonus is subjectively determined by the AFSAC Commander according to the achievement of the performance criteria.

Cancellation Rate. The Cancellation Rate is defined as 'the number of requisitions canceled by the Contractor in a quarter divided by the number of requisitions received in a quarter' (NIPARS, 1990:Modification 20).

Procurement Administrative Lead Time (PALT). PALT is defined as the time interval between date of receipt of the requisition at SAMIS and the date the requisition is placed on contract. The PALT rate is defined as "the number of requisitions placed on contract that quarter within 15 days, 30 days, 60 days, and greater than 60 days, each divided by the total number of requisitions placed on contract for the entire quarter" (NIPARS, 1992: Modification 20). The required PALT standard per quarter is described in Figure 4.

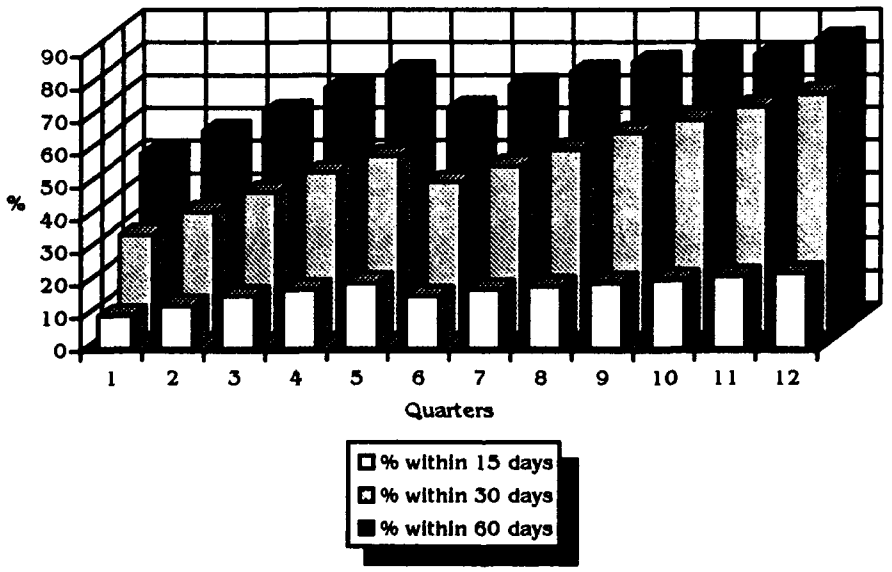

Figure 4. Required PALT Performance per Quarter (NIPARS, 1992:Modification 20)

Quality Assurance Plan. The contractor will be evaluated based on the effectiveness and application of a quality assurance plan, and the results from random inspections to be performed at the contractor/vendor facilities. Furthermore, the reduction in Reports of Discrepancy will be considered. The ROD standard to be maintained by the contractor is no more than 2% for

quarters 8 through 12. ROD rate is defined as 'the number of RODs received within the past 12 months divided by the number of requisitions shipped within the past 12 months' (Brusky, 1990: Attachment 1).

Administrative Efficiency. The efficiency of the contractor to administer and process requisitions will be measured by the number of electronic billing errors and the extent to which material prices are reduced using lot buys and order consolidation methods (Brusky, 1990: Attachment 1).

Responsiveness to DoD. The contractor's responsiveness to the requirements of the Contracting Officer, the Program Management Office, AFMC country and case managers and other DoD agencies will be considered in the formulation of quarterly bonuses (Brusky, 1990:Attachment 1).

Overall Responsiveness to Foreign Country Representatives. Foreign Liaison Officers located at WPAFB will provide some feedback to the NIPARS program office regarding the degree of satisfaction provided by the NIPARS contractor (Brusky, 1990: Attachment 1).

Priority Handling of NMCS Requisitions.. Not Mission Capable Supply (NMCS) requisitions represent an urgent need for an item that is preventing a weapon system from performing as required. The performance of the contractor in responding to NMCS requirements is measured by PALT, shipping date and degree of communication with the customer (Brusky, 1990: Attachment 1).

SAMIS Processing Overview

NSI procurement functions are steadily migrating from AFMC to the NIPARS contractor as residual stocks of NSIs are depleted. The NIPARS contractor is responsible for researching, procuring, receipting, inspecting,

packaging and distributing NSI items that cannot be satisfied by the ALCs. The ALCs identify NSIs by Acquisition Advice Code (AAC), Material Management Aggregation Code (MMAC), the source of supply (SOS) or a combination of these elements. Figure 5 is a simplified description of the flow of NSI requisitions prior to the implementation of the NIPARS program.

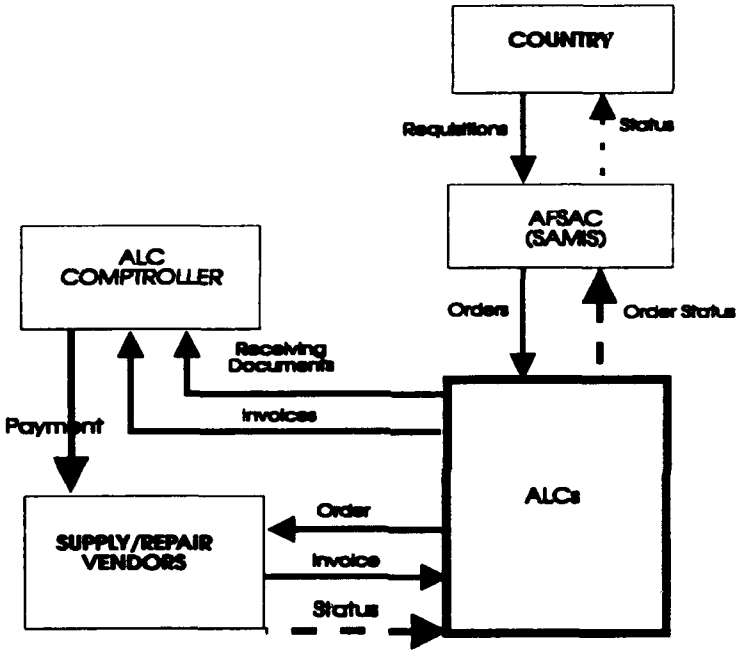

Figure 5: Simplified Flow of NSI Requisitions at AFLCs

FMS customers report both standard and nonstandard requisitions to SAMIS daily. Prior to NIPARS, the requisition was reported to the responsible ALC for action. If the requisition was nonstandard, the ALC would identify the item, locate a source of supply and initiate procurement action. The primary mandate of the ALCs is to support active USAF requirements, consequently, the time consuming and labour intensive task of filling nonstandard requisitions was frequently overshadowed by the more pressing concerns of the ALC. Consequently, NSI processing by ALCS has been an expensive and error prone process with a high proportion of NSI requisitions being canceled.

NSI Processing - NIPARS

Once the requisition enters the USAF supply system, AFSAC checks for on hand stocks of the item at any DoD source of supply. This is achieved when SAMIS transmits 'a referral order advising the assigned source of supply either to fill the requisition immediately from available stock or to cancel the requisition' (Air Force, 1992: 4). If the requirement cannot be satisfied from existing DoD stocks, AFSAC suppresses the cancellation transaction from the supply source and transmits the order to the NIPARS contractor. Figure 6, describes the flow of requisitions using NIPARS.

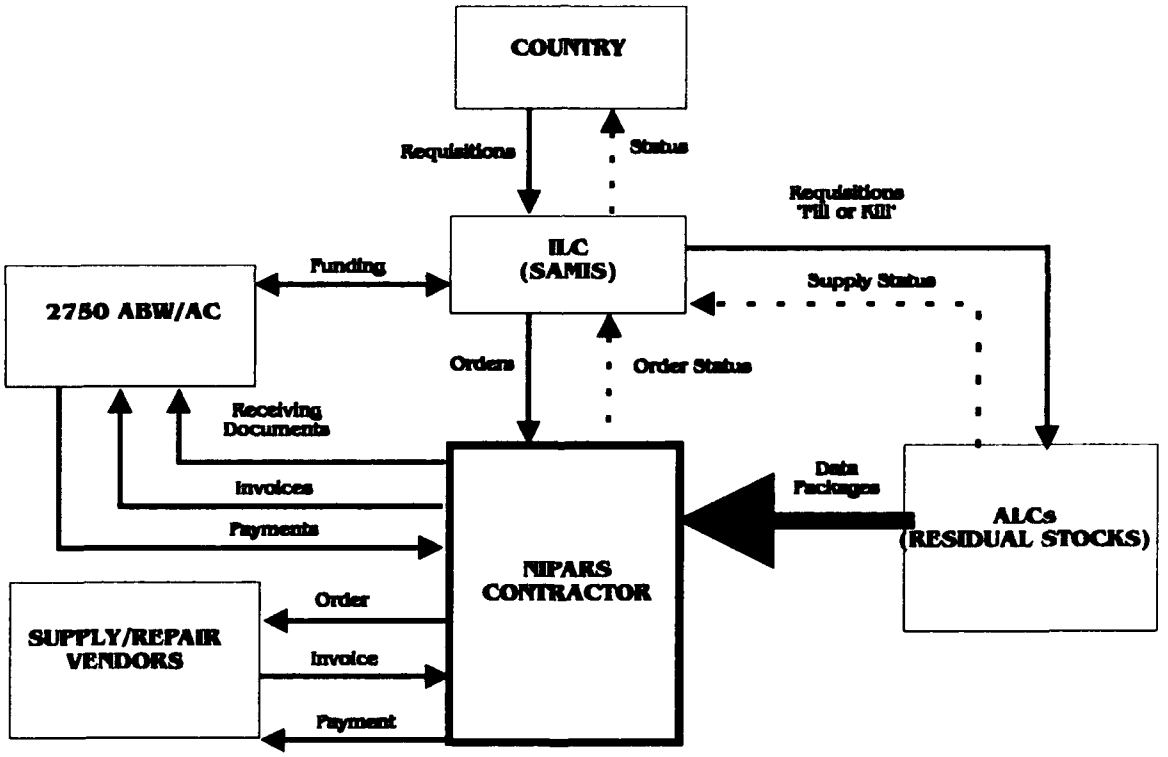

Figure 6: Flow of NSI Requisitions Under NIPARS (Brusky and Burton, 1990:84).

SAMIS identifies a requirement as standard or nonstandard based on information contained in the document identifier (DOC ID) and routing identifier code (RIC) (Air Force, 1992:5).

If a requisition has a DOC ID of A01, SAMIS compares the NSN with the SAMIS catalogue and distinguishes NSIs based on AAC, MMAC and SOS codes. If no NSN information exists on the SAMIS catalogue, the Defence Automatic Addressing System is interrogated to determine the last known source of supply for the item. The requisition is routed to NIPARS if the Air Force is identified as the last source of supply. Requisitions for part numbered items with DOC IDs of A02 and A05 are treated as nonstandard and routed directly to NIPARS (Air Force, 1992:4).

Once NIPARS locates a source of supply, a price quote is reported to SAMIS. This price is inflated by SAMIS to include the contractors fixed fee and award fee. SAMIS also confirms funds availability before the procurement proceeds (Air Force, 1992:4).

Is NIPARS Working as Advertised?

Overview. In 1992 Captain Peter de KAM and Captain Dorothy Tribble undertook a thesis to research the initial performance of NIPARS. The research problem of their thesis was defined by the Secretary of the Air Force, Office of International and Political Military Affairs (SAF/IAPPW). The specific problem was defined as

> whether or not NIPARS has improved the process of acquiring non-standard items for the USAF FMS customer. Specifically, has the average time to cancel a requisition, PALT, PLT, and cost for the customer decreased due to the implementation of NIPARS, and are customers satisfied with the process? (de KAM and Tribble, 1992:12)

The researcher's objectives were to

1. 'compare the time to cancel, PALT , PLT, and costs for non-standard items acquired under NIPARS with those same performance metrics for previously existing procedures.

2. To review customer expectations and perceptions of the NIPARS process and its effect on the provision of non-standard items' (de KAM and Tribble, 1992:13)

The research objectives of the present study pertain only to measuring quantifiable indicators of NIPARS performance; consequently, research objective two pertaining to customer satisfaction will not be discussed further.

This section summarises the results of the 1992 thesis by de KAM and Tribble titled Is NIPARS Working as Advertised? An Analysis of NIPARS Program Customer Service. All information in this section is derived from that thesis unless indicated otherwise. For the purposes of clarity, verbatim quotations have been used to communicate the author's intent.

Hypothesis and Investigative Questions. de KAM and Tribble undertook to answer three hypothesis. The first two hypothesis and their associated investigative questions provide an important grounding for the present study so they are summarised in Table 8.

Statistical Methodology. To address the seven investigative questions, de KAM and Tribble collected requisition information pertaining to post NIPARS orders, pre NIPARS orders and orders for standard items requisitioned through the FMS system. Non parametric statistical analysis was performed on most of the data when it became apparent that the data was not normally distributed.

To address hypothesis I, delivery and cancellation performance, the entire population of pre NIPARS nonstandard and standard requisitions that fell within a prescribed time period were compared to the entire population of NIPARS nonstandard requisitions since program inception. Given the size of the data set used, no attempt was made to isolate and compare like requisitions. The populations were compared based on aggregate results rather than matched pairs.

Table 8.

Hypothesis and Investigative Questions

Hypothesis I	A significant difference exists in the measures of performance for non-standard items under NIPARS as versus the previous methods used to provide this support.
Question 1	Is there a difference between the average time to cancel a requisition for non-standard items under NIPARS versus the previous methods used to provide these items?
Question 2	Is there a difference between the PALT for non-standard items under NIPARS versus the previous methods used to provide this support?
Question 3	Is there a difference between the PLT for non-standard items under NIPARS versus the previous methods used to provide this support?
Question 4	Is there a difference between the PALT for non-standard items procured under NIPARS versus AF procurement of standard items?
Question 5	Is there a difference between the PLT for non-standard items procured under NIPARS versus the PLT for AF procurement of standard items?
Hypothesis II	A significant difference exists in the cost of non-standard items under NIPARS as versus the previous methods used to provide this support.
Question 1	Is there a difference between the material cost for non-standard items under NIPARS as versus the unit price for Air Force procured non-standard items?
Question 2	Is there a difference between the total costs for non-standard items under NIPARS as versus the unit price for Air Force procured non-standard items?

(de KAM and Tribble, 1992:53)

To address hypothesis II, unit and total price, a sample of 336 nonstandard items procured under NIPARS were matched to 336 items procured using standard FMS procurement procedures. Furthermore, the researchers economically adjusted all prices prior to 1992 to cater for inflationary effects and the time value of money.

Before aggregating the pre-NIPARS sample data that characterises ALC performance and comparing it to NIPARS sample data, the data was analysed to

determine significant differences between the ALCs providing the items. As a result of this analysis, five ALCs, Sacramento (SM-ALC), Ogden (OO-ALC), Oklahoma City (OC-ALC), Warner-Robbins (WR-ALC, and San Antonio (SA-ALC) were grouped according to their performance and compared to NIPARS data.

Results. For hypothesis I, the researchers concluded that a significant difference existed in the measures of performance for nonstandard items under NIPARS versus the previous methods used to provide this support. NIPARS maintained a consistently lower PALT and PLT for both standard and non-standard items when compared to the previous method used to provide this support. Regarding cancellation rate, NIPARS did not demonstrate a lower average time to cancel.

When analysing hypothesis II, the researchers encountered extreme kurtosis for unit cost samples of AFSAC and NIPARS data. A Wilcoxon Matched Pairs Signed-Ranks test demonstrated that NIPARS average unit price was higher than AFSAC when matched NSNs were used as a basis of comparison. To examine the relationship between the samples more closely, a median test was also performed. This test showed that the populations medians were not different; therefore, the median unit price was approximately the same for each system. To address these conflicting results, the researchers performed the Kolmogorov-Smirnov test to compare relative frequency distributions of the two samples. This test demonstrated that NIPARS unit prices were drawn from a population of lower values than AFSAC unit prices. To further underline the differences between the two samples, the data was standardised by using the differences between the samples. The resulting data was normally distributed; consequently, a one tailed t-test was performed. This test demonstrated that

the distribution did not include 0 and had a 95% confidence interval around the mean from 5.05 to 65.39. From this result, the researchers

> reached the conclusion that the majority of NIPARS unit prices are lower than the AFSAC unit price. Therefore, if unit prices can be considered a true representation of materiel cost, this analysis indicates NIPARS generally provides non-standard items at a lower cost in terms of materiel value (de KAM and Tribble, 1992:107).

The researchers performed the same analysis on total cost data for the two sample populations; however, both the Wilcoxon and Median tests showed that the sample populations were different in location of both their medians and means. Given that the median and means for NIPARS samples were lower than AFSAC samples,

> the research makes the conclusion that NIPARS total costs (including economically adjusted unit price, award, and processing fees) are lower than AFSAC total costs (including economically adjusted unit price and standard FMS surcharges) (de KAM and Tribble, 1992:108).

Performing a correlational study which produced an r^2 value of .2116, the researchers demonstrated that although the majority of NIPARS prices are lower, the customer has little ability to adequately predict 'prices of the goods and services he receives based on his experiences with previous methods used to provide this support' (de KAM and Tribble, 1992:108).

The results of the data analysis presented in this thesis concludes that NIPARS is providing significantly improved support for nonstandard item procurement. However, the positive results of the NIPARS program presented in this thesis

> may lead the reader to tempting conclusions that NIPARS is a panacea for all the ills of FMS support. While providing its FMS customers superior service, NIPARS was not intended nor designed to replace the total package approach to logistics required for system sales . . . NIPARS was intended to provide 'after market' support of nonstandard items and it does an excellent job at what it was designed to do (de KAM and Tribble, 1992:115).

The purpose of the present study will be to examine the performance of NIPARS from an FMS customers perspective and it will test the validity of de KAM's and Tribble's lead time and price conclusions.

NIPARS Contract Status Review

On 17 June 1993, the NIPARS Contract Status Review was presented to the AFSAC Commander, Major General Otto K. Habedank. The purpose of this presentation was to inform the AFSAC Commander of the achievements of the NIPARS program, inform him of new initiatives and to discuss various issues that were still to be resolved.

Program Achievements. Since the NIPARS program was implemented, a total of 46,706 nonstandard requisitions have been received. The status of supply requisitioning at 15 June 1993 is summarised in Figure 7. A significant point to note in Figure 6 is the low number of contractor canceled requisitions in proportion to total requisitions received. Superficially, this would appear to indicate that NIPARS is achieving one objective; namely, to reduce the number of requisitions canceled. A further point to note is the relatively high number of requisitions processed to NIPARS that result in cross references to standard items and are referred back to AFSAC for satisfaction through normal FMS channels.

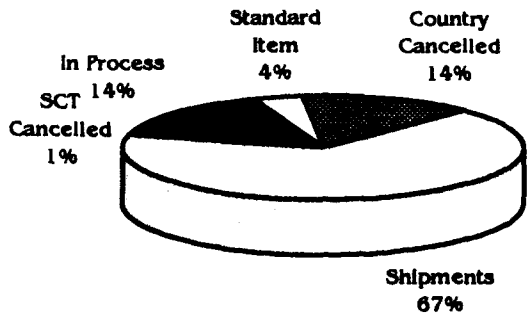

Figure 7: NIPARS Supply Requisition Summary (Systems, 1993:6)

Since January 1992, the number of requisitions received by NIPARS on a monthly basis has been inconsistent and not in line with anticipated activity. Figure 8 demonstrates the lumpy nature of NSI orders. In addition, Figure 8 compares the number of requisitions received that were processed to shipping status in comparison to the number of requisitions received and canceled prior to shipping.

A major achievement of the NIPARS program to date has been the improved performance with regard to procurement lead time. Based on requisitions received by NIPARS since 1 January 1992, the average procurement administrative lead time from receipt at NIPARS until contract placement is 41 days. Furthermore, total procurement lead time from requisition receipt at NIPARS until shipment is 99 days with 82.9% reaching shipping status within 60 days (System, 1993:7). The average requisition value for the period examined is $6,846 and the SCT fee as a percentage of material cost is currently averaging 3% (Systems, 1993:7).

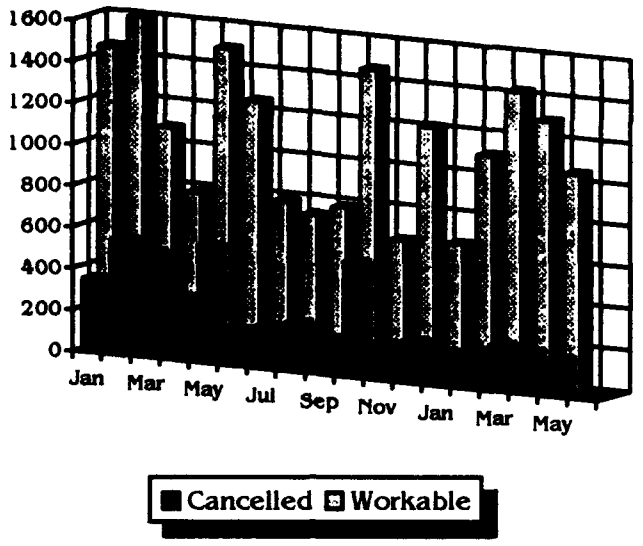

Figure 8: NIPARS Supply Requisitions by Month (System, 1993:5)

Program Achievements for Australia. Compared to the aggregate program performance, NIPARS performance based on Australian requisitions only provides an interesting picture of comparison. On 9 July 1992, Australia agreed to participate in the NIPARS program. Since that time, 76 nonstandard requisitions have been processed to NIPARS. The status of supply requisitioning for Australia is summarised in Figure 9. The major difference between total program performance and performance based on Australian requisitions is in the area of country canceled requisitions. Australia has a much higher proportion of country canceled requisitions than the program average. This difference may be due to the channeling of NSI requisitions through direct commercial sources. For example, Australia deals directly with Peterson Builders Inc (a NIPARS sub contractor) for some nonstandard requirements rather than use the FMS channel.

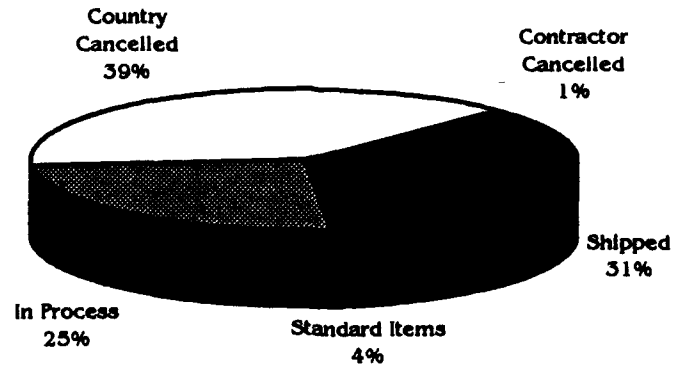

Figure 9: NIPARS Supply Requisition Summary - Australia (System, 1993:1)

Unlike the program average requisition cost, Australia presently maintains an average requisition cost of $ 37,437 and the fixed fee as a percent of material cost is only 0.8% (Systems, 1993:1). This statistic is distorted because Australia recently placed a nonstandard requisition valued at $ 280,000. This unusually large requisition value has significantly distorted the mean requisition cost.

New Initiatives. Since the implementation of NIPARS, some new initiatives have been considered and undertaken. Due to a Total Quality Management initiative at Aviation Troop Command (ATCOM), effort has been made to improve NSI support to Army FMS customers. SCT is eager to process U.S. Army NSI requisitions; consequently, AFSAC and SCT provided a briefing to ATCOM on 9 June 1993. ATCOM expressed some interest in using NIPARS to process a quantity of Egyptian repair requisitions and to complete a task order for aircraft maintenance support to Jamaica (Systems, 1993:15).

To provide improved support to FMS customers AFSAC is currently exploring NIPARS as a potential avenue for processing standard FMS items. Given the perceived success of NIPARS for processing nonstandard items, it is considered a potential alternative for processing standard items. This initiative is expected to provide improved support to FMS customers and reduce the backlog of standard items at ALCs that are older than 12 months without supply action. The procedure required to implement this initiative requires three actions;

a. review all requisitions older than 12 months without procurement status;

b. refer requisitions to NIPARS contractor; and,

c. monitor contractor performance during the test period. (System, 1993:16).

At present, contracting approval for a trial of this initiative is still pending.

Open Issues. A problematic issue that is causing the NIPARS program some problems is the refusal of some contractors to sell NSIs to NIPARS. General Electric is one contractor who seeks to sell directly to the FMS customer rather than through the intermediary of SCT. A further area of concern for SCT is the reality that requisitions referred to NIPARS continue to fall below original projections (Systems, 1993:21).

Conclusion

The concept of NIPARS marks a new direction in the acquisition of nonstandard items for FMS customers. Furthermore, its measured success to this point encourages experimentation in more traditional fields of FMS procurement. In this chapter, the NIPARS program was described and research that tested the success of NIPARS was reviewed. In conclusion, the working

status of NIPARS was examined to indicate the scope of NIPARS activity and to describe current initiatives and issues that will impact the future of NIPARS.

IV. Research Methodology

Chapter Overview

This chapter describes the research design that will be employed to achieve the research objectives stated in Chapter I of this study. The population of interest, the variables of interest, the type and source of data to be analysed, and the specific methodology that will be used to address each investigative question will be discussed in detail.

This research is designed to draw performance and cost comparisons between two different procurement systems that locate, purchase and ship nonstandard items (NSI) for FMS customers. The systems to be compared will be referred to as the FMS procurement system and NIPARS. The FMS procurement system consists of the USAF Air Logistics Centres (ALC) that procured NSIs in the past. NIPARS is the current NSI procurement system that is managed by a contract with commercial organisations to perform the procurement service.

Historical data will be required to analyse the performance of both systems; consequently, an ex post facto design will be used. An ex post facto design is characterised by the inability of the researcher to control or manipulate the variables in the study. Rather, the researcher analyses historical data only to report what is happening or what has happened. To reduce the opportunity for bias to occur, an ex post facto design requires that the data to be analysed is carefully and judiciously selected (Emory & Cooper, 1991:140-41).

Specific Problem

The research problem of this thesis was identified by the Royal Australian Air Force (RAAF) Supply Liaison Officer at Wright Patterson Air Force Base. The RAAF has been participating in the NIPARS program (Nonstandard Item Parts Acquisition and Repair System) since 9 June 1992 and has yet to determine the cost and performance effectiveness of the NIPARS procurement system in comparison to the FMS procurement system for NSIs. This research will provide an insight into the lead time and cost performance of NIPARS for the Australian Department of Defence and other FMS customers.

Research Objectives

The objective of this research is to make a determination about the value of the NIPARS program to the Australian Department of Defence. That is, does the NIPARS procurement system perform better than the FMS procurement system for locating, supplying and price of NSIs? The variables of interest are:

a. Procurement Administrative Lead Time (PALT),

b. Production Lead Time (PLT),

c. Total Procurement Lead Time (TPLT),

d. unit price,

e. NIPARS price, and

f. total unit price.

Definition of Variables

PALT. The PALT will provide an indication of the difference between the two systems in processing requisitions to the contract phase. In the context of this study, contract is defined as the point at which the supplier formally accepts the procurement order from the procurement body. The PALT is defined as the

difference between the date the requisition was received from the FMS customer by SAMIS and the date that BV or P2 status is posted in SAMIS. NIPARS uses BV status to 'confirm to SAMIS that the item has been procured and is on contract for direct shipment to the consignee' (Air Force, 1992:B-1). P2 status indicates that SAMIS has received on contract notification from the JO41 system and is applied to FMS procured orders (de KAM and Tribble, 1992:54).

To accurately assess PALT for the NIPARS contractor, this variable should be determined based on the difference between receipt date of the requisition into the NIPARS management information system and advice date to SAMIS of formal contract acceptance (BV status). However, the FMS customer is only interested in total procurement lead time from the time a requisition is submitted until the time shipped status is received by the customer; consequently, both the FMS system PALT performance and NIPARS PALT performance will be assessed under the same criteria. The researcher acknowledges that this determination of PALT could inflate the PALT of the NIPARS contractor given that delays may occur at the Air Logistics Centres (ALC) that subsequently delay transmission to the NIPARS system.

PLT. The PLT will provide an indication of the difference between the two systems in fulfilling FMS customers requirements from the point of contract placement to the point of shipping the subject item. The PLT is defined as the difference between the date of contract award, indicated by BV or P2 status, and the shipping date, indicated by AS status reported by the NIPARS contractor to SAMIS. This analysis assumes that there is no significant delay between the actual time of contract acceptance and the point at which BV status is reported to SAMIS.

TPLT. To compare the womb to tomb performance of both systems, a determination of TPLT is required. This variable is defined as the time period between receipt of requisitions into SAMIS and reporting of shipping status (AS) to SAMIS (Air Force, 1992:B-1). For the purpose of this analysis, shipping status occurs when the procured item is made available to the customer. The researcher acknowledges that the NIPARS contractor and the FMS system commonly arrange transportation of delivered items to the FMS customer's freight forwarder; consequently, AS status is not a precise indication of delivery to the FMS customer.

Unit Price. Unit price is the cost of the item prior to the application of any FMS bottom line charges or NIPARS fees and bonuses. That is, unit price is the price charged by the vendor and is representative of material costs, vendor overhead and profit. Unit price data for both systems will be extracted from the SAMIS.

NIPARS Price. The NIPARS price is the unit price charged by the NIPARS contractor. This price includes the following elements;

a. unit cost charged by source of supply,

b. fixed fee,

c. award fee.

The NIPARS unit price is computed by dividing the total requisition cost (inclusive of the NIPARS fixed fee and award fee that is applied to the total requisition value and not unit value) by requisition quantity. Since March 1992, the value of the award fee applied to each requisition has been less than the maximum award indicated by Table 7. The price data provided by SAMIS included the actual award fee and fill fee that was applied by the SAMIS data

base and that was charged to the FMS customer. The award fee and fixed fee was not applied by the researcher.

Total Unit Price. The total unit price is the end price paid by the FMS customer and is inclusive of bottom line FMS charges. In the case of the FMS procurement system the total unit price comprises the following elements:

a. unit price charged by source of supply,

b. logistics support charge of 3.1%,

c. contract administration surcharge of 1.5%, and

d. Nonstandard administrative surcharge of 5% (Brusky, 1993b:1).

The elements of the total unit price paid by the customer for items procured through the NIPARS program are:

a. unit cost charged by source of supply,

b. fixed fee,

c. award fee,

d. logistics surcharge of 3.1%,

e. contract administration surcharge of 1.5%, and

f. administrative surcharge of 3% (Brusky, 1993b:1).

In both cases, the 3.1% and 1.5% FMS charges are above the line charges and the administrative surcharge of 3% or 5% is levied against the requisition value that is inclusive of above the line charges. However, the total unit price will be calculated by applying a factor of 9.6% to FMS unit price and 7.6% to NIPARS unit price. This method simplifies the application of FMS charges and is applied equally to both systems to eliminate bias.

Investigative Questions

Investigative Question I. Is there a difference between the average PALT for NSIs procured under NIPARS compared to NSIs procured by the standard FMS system?

Investigative Question II. Is there a difference between the average PLT for NSIs procured under NIPARS compared to NSIs procured by the standard FMS system?

Investigative Question III. Is there a difference between the average TPLT for NSIs procured under NIPARS compared to NSIs procured by the standard FMS system?

Investigative Question IV. Is there a difference between the average TPLT for Australian NSI requisitions procured under NIPARS compared to Australian NSI requisitions procured by the standard FMS system?

Investigative Question V. Is there a difference between the average unit price for NSIs procured by NIPARS compared to the average unit price of NSIs procured by the FMS system?

Investigative Question VI. Is there a difference between the average NIPARS unit price for NSIs procured by NIPARS compared to the average total unit price of NSIs procured by the FMS system? This comparison will permit NIPARS to be compared to the FMS procurement system independently of the FMS program. The purpose of this comparison is to indicate the competetiveness of commercial procurement sources, like the NIPARS program, when compared to traditional FMS procurement methods.

Investigative Question VII. Is there a difference between the average total unit price for NSIs procured by NIPARS compared to the average total unit price of NSIs procured by the FMS system?

Investigative Question VIII. Is there a difference between the average NIPARS unit price for Australian NSI requisitions procured by NIPARS compared to the average total unit price of Australian NSI requisitions procured by the FMS system?

Investigative Question IX. Is there a difference between the average total unit price for Australian NSI requisitions procured by NIPARS compared to the average total unit price of Australian NSI requisitions procured by the FMS system?

Methodology

Population One. The first population of interest for this study is all Australian Department of Defence nonstandard item requisitions that have been completed by NIPARS and have AS status reported (item has been shipped) on SAMIS. Only those requisitions with NSNs that can be matched to identical NSNs procured by the FMS system, prior to the implementation of NIPARS, will be included. The period of interest will cover 9 June 1992 to 30 June 1993.

Population Two. The second population of interest for this study is all Australian Department of Defence nonstandard item requisitions that have been procured by the FMS system and have AS status reported (item has been shipped). Only those requisitions matched to identical NSNs procured using NIPARS will be included. The period of interest will cover 1 January 1981 to 1 January 1991.

Population Three. The third population of interest for this study is all FMS customers nonstandard item requisitions that have been procured by NIPARS and have AS status reported (item has been shipped) on SAMIS. Only those requisitions that can be matched to identical NSNs prior to the

implementation of NIPARS will be included. The period of interest will cover 1 January1991 to 30 June 1993.

Population Four. The fourth population of interest for this study is all FMS customers nonstandard item requisitions that have been procured by the FMS system and have AS status reported (item has been shipped). Only those requisitions that can be matched to identical NSNs procured under the NIPARS program will be included. The period of interest will cover 1 January 1981 to 1 January1991.

Data Source. All data to be analysed in this study will be extracted by NSN from the SAMIS data base. NIPARS procurement data is reported to the SAMIS data base; consequently the range of data required in this study is available from a single source.

Data Analysed. The data to be analysed will consist of all requisitions in populations one and three that have matching National Stock Numbers (NSNs) in populations two and four respectively. Consequently, the entire population of NSNs common to both systems, will be analysed. The objective of pairing data items is to increase the accuracy of the comparison of the two systems (Snedecor and Cochran, 1980:88). For example, nonstandard Magnavox radios that are being procured by Australia through NIPARS cannot be meaningfully compared to a nonstandard flying glove procured using past FMS procurement methods. A radio is a complex item of equipment that is likely to have a longer procurement lead time and greater cost than a nonstandard flying glove. To facilitate meaningful comparison, only NSNs that can be matched between both data sets will be compared.

The researcher anticipates that some NSNs that are extracted from SAMIS will have been procured more than once under each system. In this situation,

the average value of each variable will be calculated for each NSN. The comparison between the two procurement systems will be performed by comparing the average variable values for each matched NSN in addition to comparing population means.

Economic Price Adjustment. When performing a price analysis, a valid comparison cannot be performed between item prices for 1977 procurements and those prices for 1993 procurements, unless inflationary effects are considered. In addition to adjusting unit prices to account for FMS charges, all prices will be further adjusted using the USAF Raw Inflation Indices (AFR 173-13 Attachment 45) to convert constant dollars in all years to constant dollars in 1992. That is, 1992 is the base year against which all prices will be inflated/deflated.

Descriptive vs Inferential Analysis. The principal method of statistical analysis employed in this study will be descriptive. In the case of descriptive analysis, the researcher is concerned with "the direct exhaustive measurement of population characteristics" (Kash Kachigan, 1986:9), otherwise referred to as population parameters. This method requires that all members of the population are observed in order to precisely state the value of the parameter. In contrast to the descriptive method, "inferential statistical analysis is concerned with measuring the characteristics of only a sample from the population and then making inferences, or estimates about the corresponding value of the characteristics in the population from which the sample was drawn" (Kash Kachigan, 1986:9). Since this study observes all members of the defined population of NSI procurements common to both systems, descriptive statistical analysis is an appropriate method to employ.

In conjunction with descriptive statistics, some preliminary inferential analysis will be performed to provide insight into the greater population of NSI requisitions from which the matched NSN population belongs. Given that the population of interest is not randomly selected from the population of all NSI requisitions, the assumption that requires samples to be randomly selected, when performing non-parametric analysis, will be relaxed. The records extracted from the SAMIS data base provides a broad cross section of NSNs from most supply classes. On this basis, the assumption of randomness is relaxed.

Based on de Kam's and Tribble's experience, the variables to be analysed are unlikely to be normally distributed, demonstrating a high degree of skew and kurtosis. Assuming this is the case and considering that the data is not randomly selected, non parametric analysis will be performed as an adjunct to the primary descriptive analysis.

Population Comparison. To compare the performance of NIPARS to the performance of the FMS system, the population mean for each variable will be compared and analysed. If the population distribution is not normal and demonstrates a high degree of skew and kurtosis, then the median for each variable will be used to measure the middle of the distribution. If a population distribution is symmetrical about the mean, then the mean and the median coincide and the distribution is considered normal. However; populations with a high degree of skew and kurtosis are often more accurately represented by the median rather than the mean. Under these circumstances, the median is unaffected by erratic and extreme values; consequently it provides a superior indication of central tendency (Snedecor and Cochran, 1980:136).

The results of non-parametric statistical tests will be reported using the observed significance level (otherwise known as a p-value). The observed significance level 'is the probability, (assuming the null hypothesis is true), of observing a value of the test statistic that is at least as contradictory to the null hypothesis (and as supportive of the alternative hypothesis) as the one computed from the sample data' (McClave and Benson, 1991:361). That is, the observed significance level informs the reader of the probability of being wrong in the conclusions he seeks to infer. The null hypothesis will be rejected by the researcher if the p-value of the test is less than the fixed significance level (α). In this study, a α of .05 will be used. There are two major advantages of reporting test results in this manner, 1) readers are able to draw their own conclusions about the reported hypothesis test by determining their own α and comparing it to the reported p-value; and, 2) a measure of the degree of significance of the test result is provided (McClave and Benson, 1991:363).

Non-Parametric Tests. In addition to comparing the population means (or medians in the case of non normal distributions), the two systems will be compared based on matching NSNs common to each system. A Wilcoxon Signed Ranks Test will be performed on each variable consisting of matched pairs. This non-parametric test ranks the absolute values of the differences between matched data items and then tests the ranks of the items rather than the value of the difference. The strength of the Wilcoxon Signed Ranks Test is that it considers the magnitude and the direction of the differences of paired observations in addition to assigning more weight to a pair showing a larger difference than to a pair showing a smaller difference (Hill and Kerber, 1967:324). The power of this test is reduced if a high proportion of tied observations are encountered. If this problem is encountered during the

analysis of a variable, then the Sign Test will be performed. The Sign Test is sometimes used 'when the investigator doubts that the distribution of the differences between members of a pair is at all close to normal' (Snedecor and Cochran, 1980:139). In this case, the difference between the paired items is replaced by their signs (+ or -) and the size of the differences are ignored (Snedecor and Cochran, 1980:139).

Factors Considered in Data Selection

General Observations. Two methods of data selection were considered. The first method selects all requisitions received by SAMIS, and reported to the NIPARS contractor, in the period of observation. The NSNs of these requisitions would then be matched to identical NSNs of requisitions contained in the pre NIPARS populations; that is, requisitions administered using the FMS procurement system.

The second method selects only those requisitions that have been submitted to SAMIS and delivered by the NIPARS program in the period of observation. These requisitions are then matched to requisitions with identical NSNs from the pre NIPARS populations and only those requisitions that have reported shipping status will be considered. The first method does not permit the concept of womb to tomb procurement lead time to be captured for all matched pairs. That is, some pairs may be supply complete while others may still be in the procurement lead time chain. Furthermore, partially completed requisitions identified under the NIPARS system should not be matched to supply complete requisitions from the FMS system because prices of partially complete requisitions may not be finalised. In essence, method one contains

many possibilities that could bias results; consequently, method two is preferred.

Period of Observation. The NIPARS program commenced operations in November 1990. Australia did not elect to participate until 9 June 1992 (Headquarters, 1992:1). In the interim some effort was made to satisfy Australian NSI requisitions utilising ALCs (Brusky, 1993b:2). At this time, ALC attention to NSI procurement significantly declined as administrative effort focused upon procurement of standard items. To avoid a potential source of bias that may inflate total procurement lead time data for ALC procured NSIs, Australian requisitions submitted between 1 November 1990 and 9 June 1992 will not be included.

TPLT. Important factors to consider when defining TPLT data were highlighted in the research performed by de KAM and Tribble. They noted that a fair comparison of pre and post NIPARS implementation required the use of the same yard stick for both systems. The contractor may forward certain status codes to SAMIS that turns off the Procurement Administrative Lead Time (PALT) clock. This action takes place when administrative delays occur that are beyond the contractor's control. An example is the requirement for the NIPARS contractor to forward a price quote to the customer for approval. In these circumstances, the PALT clock is turned off to avoid detriment to the contractor's award fee (de KAM & Tribble, 1992:57). In this analysis, periods in which the PALT clock is turned off will not be included in determining TPLT performance between the competing systems. The customer is interested only in the total lead time performance of both systems; consequently, non attributable delays in processing requisitions will not be accounted for when drawing conclusions about the TPLT performance of both systems.

Price. De KAM and Tribble made three critical assumptions in their assessment of unit price differences between the two populations. Two of these assumptions will be adopted in this study, they are;

i. Inflation indices used to inflate/deflate the unit costs of historical prices to 1992 prices is a useful representation of the price increase each unit is subjected to over time. AFR 173-13, Attachment 45 USAF raw inflation indices were used to inflate/deflate historical prices to 1992 dollars.

ii. All pre NIPARS nonstandard procurement cases were subject to the same surcharges (de KAM & Tribble, 1992:57-8) .

Furthermore, the researcher assumes that any refunds made to FMS customers as a result of excess funds accumulating in the award fee account will not significantly impact NIPARS unit prices. The NIPARS unit price is defined as the material cost in addition to the contractors fixed fee and award fee. The fixed fee and award fee are dependent upon the total requisition value and assigned requisition number; consequently, locating the precise NIPARS price for a specific item is difficult. The following case provides an example.

A requisition for quantity 4 of NSN 1560 00 191 0833 was forwarded to NIPARS shortly after the program commenced. The vendor's unit price was $154.32 and the requisitioned total value was $ 617.26. This requisition was assigned a number between 1 and 10,000 and the total value was under $2,500; consequently, the fixed fee for this requisition was $108.80 and the award fee was $ 50.00. The final requisition value was $ 776.06 therefore unit price is calculated to be $194.02. This same item was requisitioned some time later for a quantity of 37. The vendor's unit price remained constant and the requisition total value was $ 5,709.84. Because this requisiton was assigned a requisition number from the requisition block 10,001 to 20,000 and the value exceeded $2,500, a fixed fee of $ 314.38 and an award fee of $200 was

charged. The total requisition value was $6,224.22 and the unit price was $168.22. This case demonstrates that the NIPARS unit price will vary depending upon the total requisition value and the requisition block from which the number is assigned. Although material cost is the same per unit the NIPARS price is $194. 02 in the first case and $168.22 in the second case. Consequently, the NIPARS price derived in this study can only be an approximation of the unit price paid for procurements made by NIPARS.

Furthermore, the researcher acknowledges that multiple requisitions of an NSI may indicate varying unit prices due to the effects of lot buys and quantity discounts.

Data Verification. A final source of bias exists in the integrity of the data extracted from the SAMIS database. To verify the integrity of the SAMIS database, the researcher will perform a test check of unit price, and quantity that is recorded by the NIPARS MIS to the same data recorded by SAMIS. Given that the NIPARS fixed fee and award fee is applied by the SAMIS database, the researcher assumes that this data is accurate, sound and correctly applied to render a truthful reflection of the FMS customers activity with regards to NSI procurement.

Furthermore, the researcher assumes that the electronic reporting link between the SAMIS system and the SCT Management Information System (MIS) is timely and reliable. Data analysed in this study to indicate NIPARS and FMS performance will be extracted from the SAMIS system only; therefore, performance data reported to SAMIS from the SCT MIS is assumed to be reliable and not subject to significant failure.

Summary

The ultimate objective of this research is to assess the effectiveness of the NIPARS procurement process in the procurement of NSIs for the Australian Department of Defence and other FMS customers. To make a valid assessment of performance, NIPARS will be compared to the FMS procurement system. The variables measured will be PALT, PLT, TPLT, unit price, NIPARS price, and Total Unit price. Conclusions about the performance of NIPARS and its value to the Australian Department of Defence, as a suitable nonstandard item procurement channel, will be drawn from this analysis.

V. Results

Chapter Overview

This chapter describes the analysis performed in this research and provides the results. The chapter commences with an explanation regarding modifications to the methodology that were necessitated by questionable data integrity, a high degree of data variability, non normal data distribution and limited Australian requisition data. In addition, the chapter lists the statistical results for each research question that forms the core of this study.

Methodology Modification

The data analysed in this study was provided from two different sources. The primary source was the Security Assistance Management Information System (SAMIS) used by AFSAC. The second source of data was the management information system managed by the NIPARS contractor. Using the SAMIS data, the analysis was complicated by the researcher's suspicion regarding the integrity of SAMIS records. In addition, the analysis was further complicated by high variability in price data. This variability significantly skewed the distributions; consequently, some changes in methodology were required.

Data Integrity. After performing the price analysis, the researcher detected grave inconsistencies in the results. To check the integrity of the raw SAMIS data, 664 requisitions procured using NIPARS and reported on the SAMIS data base, were obtained from the NIPARS information system. Given that the NIPARS information system reports procurement data to the SAMIS system, the unit price, and quantity purchased for each requisition should be identical for both systems. A desk check was performed to verify that the quantity

purchased for each requisition obtained from SAMIS was the same as the identical requisition quantity reported by NIPARS. The two systems demonstrated different quantities purchased on more than 50% of the data analysed. In most cases, the SAMIS quantity purchased was one greater than the NIPARS quantity purchased. In some cases, the SAMIS quantity purchased was at least double the NIPARS quantity purchased. Unit price was determined by dividing the vendors requisition total by the SAMIS reported quantity purchased; consequently, this discrepancy resulted in NIPARS unit prices being artificially low.

The true quantity purchased was reported by the NIPARS management information system. According to SAMIS personnel, the SAMIS quantity purchased was corrupted by that systems method of accounting for the NIPARS contractor award fee. The award fee for timely lead time performance on an order was being signified by the addition of a fictitious unit to quantity purchased (Zeigler, 1993:1). SAMIS is aware of this anomaly and it is currently being rectified. A sample of the data differences between the two management information systems is contained at Appendix B.

The de KAM and Tribble thesis used price data from SAMIS; however, there is no indication in their research that this anomaly was detected. Their conclusion that NIPARS unit prices are lower than FMS unit prices may have been caused by the use of artificially low NIPARS unit prices provided by SAMIS.

Variance. A high degree of variance was present in the data analysed. For example, Procurement Administrative Lead Time (PALT) for procurements undertaken by the FMS system ranged from 37 days to 4,161 days. Of greater concern was the variance associated with unit prices. FMS material unit prices ranged from $ 0.00 to $ 37,451 and NIPARS material unit prices ranged from

$0.40 to $ 86,458.80. This variation produced a high degree of skew and kurtosis. Skewness in a population indicates a tendency for the relative frequency distribution to stretch out in one direction (McClave and Benson, 1991:82). In the case of unit price data, the majority of requisitions reflected lower priced items that were clustered below the mean while higher priced items extended far above the mean. Kurtosis indicates the peakedness of a relative frequency distribution. In the case of unit price data, the majority of data points were contained in a small price range; however, the presence of a small number of extremely high prices extended the positive tail of the distribution far beyond the normal distribution.

Based upon de KAM's and Tribble's research, the data used in this study was not expected to be normally distributed. The high degree of skew and kurtosis, the high standard deviations and the large difference between the mean and median for each variable confirmed the presence of non normal distributions; consequently, non parametric methods of analysis were required. Furthermore, the researcher determined that the median would be a more reliable indicator of central tendency rather than the mean, due to the high degree of skew and kurtosis. For descriptive purposes, both the raw lead time and price data would be analysed using the median. Matched pairs would be analysed using the Wilcoxon Signed Ranks test. The Wilcoxon Signed Ranks test is a non parametric test that compares two probability distributions when a matched pair design is used. This test analyses the difference between the matched observations and then ranks the absolute differences after removing negative signs. Once the differences are ranked, their signs are restored and the sum of the negative differences and positive differences are calculated. The test statistic then becomes the smaller of the positive and negative rank sums

(McClave and Benson, 1991:963). This statistical test is valuable because it provides an indication of the direction and magnitude of difference between matched pairs.

The analysis of lead time performance progressed as defined in Chapter V and was not significantly affected by the unusual data distribution. However, the price analysis proved to be very problematic, requiring modification of the original methodology and considerably more treatment.

Australian Data. Australia commenced her participation in the NIPARS program on 9 June 1992. Since that time, only 76 NSI requisitions have been processed to NIPARS. Of this population, only 21 requisitions indicated shipped status. A further complicating factor was the high proportion of NSIs that were satisfied from USAF stock (15 requisitions). Those requisitions satisfied from stock were removed to avoid biasing PALT results in favor of the FMS system. This requirement left only six valid requisitions to analyse. Given the small amount of data, the researcher determined that no meaningful results could be achieved; consequently, negative results are reported for investigative questions IV, VIII and IX.

Lead Time Analysis

Two types of analysis were performed on the lead time data. The first analysis took the mean lead time for NSNs requisitioned more than once and compared the two systems by creating pairs that were matched based on the NSN. The Second was an analysis of the population of requisitions extracted from the SAMIS data base.

Lead Time Matched Pairs Analysis

The original data set in the matched pairs analysis consisted of 620 FMS system requisitions and 653 NIPARS procured requisitions. This data set was reduced to 270 NSNs that were common to both systems. For comparison purposes, the lead times for NSNs that had been procured more than once by either system, were reduced to the average procurement time for that NSN. The researcher observed that the first procurement of an item generally had slightly longer PALT than subsequent purchases. This is intuitively obvious given that time is taken to locate a source of supply when an item is first procured; consequently, the PALT, PLT and TPLT for each NSN are approximations only.

The results of the first lead time analysis based on matched pairs is reproduced in Table 9. The presence of high skew and kurtosis warranted further treatment of the matched pairs. Upon inspection of the data, seven NSNs demonstrated NIPARS PALT that exceeded 2,000 days. These matched NSNs were deleted because they did not belong to the observed population.

Table 9.

Descriptive Statistics
Lead Time for Matched Pairs

	FMS PALT	NIPARS PALT	FMS PLT	NIPARS PLT	FMS TPLT	NIPARS TPLT
N	270	270	270	270	270	270
Lo CI 95%	347.24	88.95	218.42	96.01	583.94	194.73
Mean	405.51	156.45	247.5	105.60	653.10	262.17
Up CI 95%	463.78	223.95	276.59	115.18	722.26	329.61
SD	486.32	563.37	242.76	79.99	577.21	562.86
Minimum	37	11	2	7	105	29
Median	311	40	154.5	103	514	140
Maximum	4161	3966	1205	601	4638	4052
Skew	6.09	5.97	1.64	2	4.57	5.76
Kurtosis	42.03	34.91	1.85	6.85	27.07	33.13

That is, these requisitions were for items originally ordered through the FMS system but were subsequently transferred to the NIPARS system for procurement. However, a high value outlier in the FMS systems population was not removed because there was no evidence that it did not belong to the observed population. The importance of these outliers will be further discussed in Chapter VI.

Table 10 reproduces the results from the second analysis.

Table 10

Second Analysis
Descriptive Statistics - Lead Time
for Matched Pairs

	FMS PALT	NIPARS PALT	FMS PLT	NIPARS PLT	FMS TPLT	NIPARS TPLT
N	263	263	263	263	263	263
Lo CI 95%	329.54	56.50	215.21	96.83	561.12	159.13
Mean	365.91	67.29	244.79	106.6	610.79	174.02
Up CI 95%	402.28	78.09	274.37	116.37	660.46	188.9
SD	299.53	88.88	243.66	80.48	409.09	122.60
Minimum	37	11	2	7	105	29
Median	311	39	153.0	104	506	140
Maximum	3893	872	1205	601	4406	909
Skew	6.68	4.59	1.69	2	3.68	2.38
Kurtosis	71.86	30.85	2.14	6.76	27.25	8.21

The impact of removing outliers from the two distributions was to significantly reduce the skew and kurtosis for NIPARS to levels that permit the descriptive statistics to have more meaning. However, the kurtosis and skew remain high for the FMS system PALT and TPLT and for the NIPARS PALT. These coefficients remain high because one FMS system outlier and two NIPARS outliers were retained. No valid reason could be found to legitimately remove

them. Although the skew and kurtosis are reduced, the relative frequency distributions for each variable exhibit no traits of normality; consequently, the median will be used to provide a measure for central tendency.

The means and medians reproduced in Table 10 closely approximate the means and medians resulting from the population statistics contained in Table 12. For example, the mean for the NIPARS TPLT in the population statistics is 164.51 and the median is 140. This closely compares to the matched pairs statistics where the NIPARS TPLT mean is 174.02 and the median is 140. This comparison indicates that the method of averaging requisitions of a particular NSN provides a close approximation to the variables true value.

Results - Investigative Question I. Investigative question I seeks to determine if a difference in PALT exists between the median PALT for NSIs procured under NIPARS compared to NSIs procured by the FMS system. Using the descriptive statistics located in Table 10, the median PALT for NIPARS is 39 days compared to a median PALT of 311 days for the FMS procurement system. NIPARS PALT performance exceeds the FMS system PALT performance by an average of 272 days.

To confirm the descriptive results, the Wilcoxon Signed Ranks Test was performed. Using the fixed significance level of $\alpha = .05$, a p value greater than .05 requires accepting the null hypothesis (H_o) and a p value lower than .05 requires rejecting the null hypothesis and accepting the alternative hypothesis (H_a).

H_o The probability distributions of PALT for NIPARS and the FMS system are the same.

H_a The probability distributions of PALT for NIPARS is shifted to the left of the FMS systems probability distribution.

Test Statistic: T = -875

P value: P = .00001

Rejection Region: $P \leq .05$

Conclusion: Fail to accept H_o. The PALT probability distribution for NIPARS is shifted to the left of the PALT probability distribution for the FMS system indicating that the FMS systems PALT is greater than NIPARS PALT.

The results of the Wilcoxon Signed Ranks Test clearly support the conclusion that the procurement administrative lead time required to purchase NSIs is significantly higher in the FMS system. However, 116 values out of 263 were tied and required ranks to be averaged. Given the high proportion of ties, the sign test was performed to confirm the results.

H_o The PALT for NIPARS and the PALT for the FMS system are the same.

H_a The PALT for NIPARS is less than the PALT of the FMS system.

Number of positive differences = 10
Number of negative differences = 253

P value: P = .00001

Rejection Region: $P \leq .05$

Conclusion: Fail to accept H_o. The PALT for NIPARS is less than the PALT for the FMS system.

The results of the sign test support the results of the Wilcoxon Signed Rank Test. Only in ten out of 263 cases did the PALT of NIPARS exceed the PALT of the FMS system; consequently, the Wilcoxon Signed Ranks Test and the Sign Test clearly support the conclusion that NIPARS PALT performance is superior to the FMS system.

Results - Investigative Question II. Investigative question II seeks to determine if a difference in PLT exists between the PLT for NSIs procured under NIPARS compared to NSIs procured by the FMS system. Using the descriptive statistics located in Table 10, the median PLT for NIPARS is 104 days compared to a median PLT of 153 days for the FMS procurement system. NIPARS PLT performance exceeds the FMS system PLT performance by an average of 49 days.

To confirm the descriptive results, the Wilcoxon Signed Ranks Test was performed.

H_o The probability distributions of PLT for NIPARS and the FMS system are the same.

H_a The probability distributions of PLT for NIPARS is shifted to the left of the FMS systems probability distribution.

Test Statistic: T = -6,996

P value: P = .00001

Rejection Region: $P \leq .05$

Conclusion: Fail to accept H_o. The PLT probability distribution for NIPARS is shifted to the left of the PLT probability distribution for the FMS system indicating that the FMS systems PLT is greater than NIPARS.

The results of the Wilcoxon Signed Ranks Test clearly support the conclusion that the production lead time required to produce NSIs is significantly higher in the FMS system. However, 156 values out of 263 cases were tied and required ranks to be averaged. Given the high proportion of ties, the sign test was performed to confirm the results.

H_o The PLT for NIPARS and the PLT for the FMS system are the same.

H_a The PLT for NIPARS is less than the PLT of the FMS system.

Number of positive differences = 77
Number of negative differences = 185

P value: P = .00001

Rejection Region: $P \leq .05$

Conclusion: Fail to accept H_o. The PLT for NIPARS is less than the PLT for the FMS system.

The results of the sign test support the results of the Wilcoxon Signed Rank Test. Only in 77 out of 263 cases did the PLT of NIPARS exceed the PLT of the FMS system; consequently, the Wilcoxon Signed Ranks Test and the Sign Test clearly support the conclusion that NIPARS PLT performance is superior to the FMS system.

Results - Investigative Question III. Investigative question III seeks to determine if a difference in TPLT exists between the TPLT for NSIs procured under NIPARS compared to NSIs procured by the FMS system. Using the descriptive statistics located in Table 10, the median TPLT for NIPARS is 140 days compared to a median TPLT of 506 days for the FMS procurement system. NIPARS TPLT performance exceeds the FMS system TPLT performance by an average of 366 days.

To confirm the descriptive results, the Wilcoxon Signed Ranks Test was performed.

H_o The probability distributions of TPLT for NIPARS and the FMS system are the same.

H_a The probability distributions of TPLT for NIPARS is shifted to the left of the FMS system's probability distribution.

Test Statistic: T = -482.5

P value: P = .00001

Rejection Region: $P \leq .05$

Conclusion: Fail to accept H_o. The TPLT probability distribution for NIPARS is shifted to the left of the TPLT probability distribution for the FMS system indicating that the FMS systems TPLT is greater than NIPARS.

Similar to the results in investigative questions I and II, the results of the Wilcoxon Signed Ranks Test clearly support the conclusion that the total lead time required to provision NSIs is significantly higher in the FMS system. However, 87 values out of 263 cases were tied and required ranks to be averaged. Given the high proportion of ties, the sign test was performed to confirm the results.

H_o The TPLT for NIPARS and the TPLT for the FMS system are the same.

H_a The TPLT for NIPARS is less than the TPLT for the FMS system.

Number of positive differences = 13
Number of negative differences = 250

P value: P = .00001

Rejection Region: $P \leq .05$

Conclusion: Fail to accept H_o. The TPLT for NIPARS is less than the TPLT for the FMS system.

The results of the sign test support the results of the Wilcoxon Signed Rank Test. Only in 13 out of 263 cases did the TPLT of NIPARS exceed the TPLT of the FMS system; consequently, the Wilcoxon Signed Ranks test and the Sign test clearly support the conclusion that NIPARS TPLT performance is superior to the FMS system.

Results - Investigative Question IV. Due to the absence of sufficient Australian lead time data for procurements undertaken by NIPARS, negative results are reported.

Lead Time Population Analysis

The population analysed consisted of procurements of NSNs that were common to both the NIPARS and FMS systems. 653 requisitions pertaining to procurement from NIPARS and 620 requisitions pertaining to procurement using the FMS system were analysed. As depicted in Table 11, the first analysis produced highly skewed results that reduced the usefulness of the descriptive statistics.

Table 11

Descriptive Statistics For Lead Time

	FMS PALT	NIPARS PALT	FMS PLT	NIPARS PLT	FMS TPLT	NIPARS TPLT
N	620	653	620	653	620	653
Lo CI 95%	388.13	74.199	228.95	95.56	628.49	176.09
Mean	417.65	104.15	247.7	102.79	665.36	206.94
Up CI 95%	447.17	134.10	266.44	110.01	702.22	237.79
SD	374.29	389.76	237.65	94.05	467.41	401.47
Minimum	37	11	0	4	105	21
Median	335.5	37	165.5	77	540.50	140
Maximum	4161	3966	1205	663	4638	4095
Skew	5.97	9	1.6227	1.94	3.92	8.12
Kurtosis	52.47	81.9	1.85	5.18	27.61	70.86

The PALT and TPLT results for both systems demonstrated high skew and kurtosis due to the effects of a small number of extremely high lead times. This result is clearly evident in Figure 10.

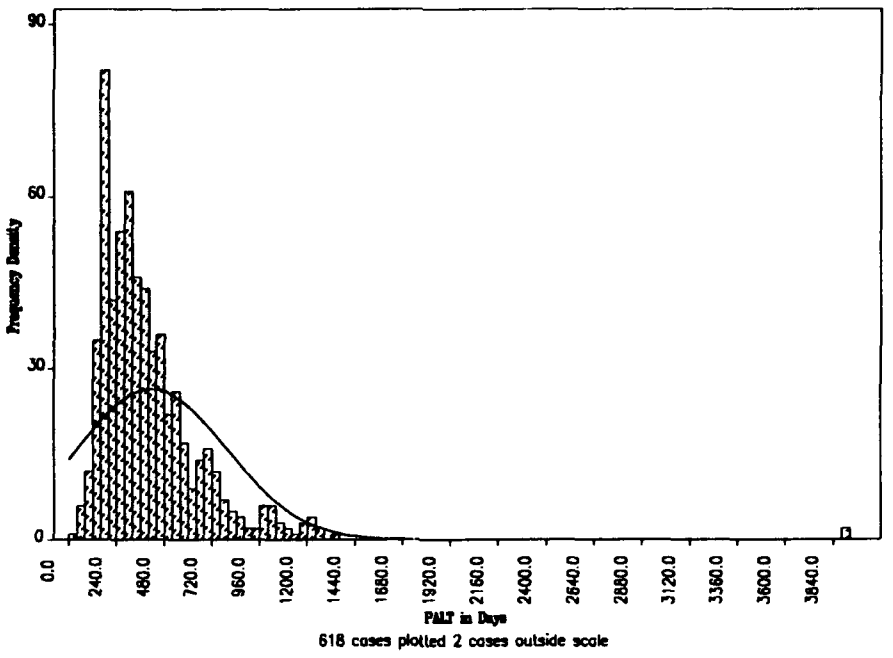

Figure 10: Frequency Histogram of FMS System PALT

A normal curve is superimposed over the distribution demonstrating the degree to which the outliers, at approximately 4,000 days, are contributing to the kurtosis and skewness of the distribution. Although these requisitions are members of the population, they are outliers that significantly affect the results. Consequently, the four requisitions located at the 3000 to 4000 day range were removed from the population and will be commented upon separately in Chapter V1. Furthermore, the location of each variable's median in relation to the mean is not indicative of a normal distribution. For example, the mean PALT for NIPARS is 104.15 days while the median is located significantly below the mean with a value of 37 days

The PALT distribution for NIPARS exhibited a higher degree of skewness than the distribution for the FMS system. The NIPARS PALT distribution is provided at figure 11.

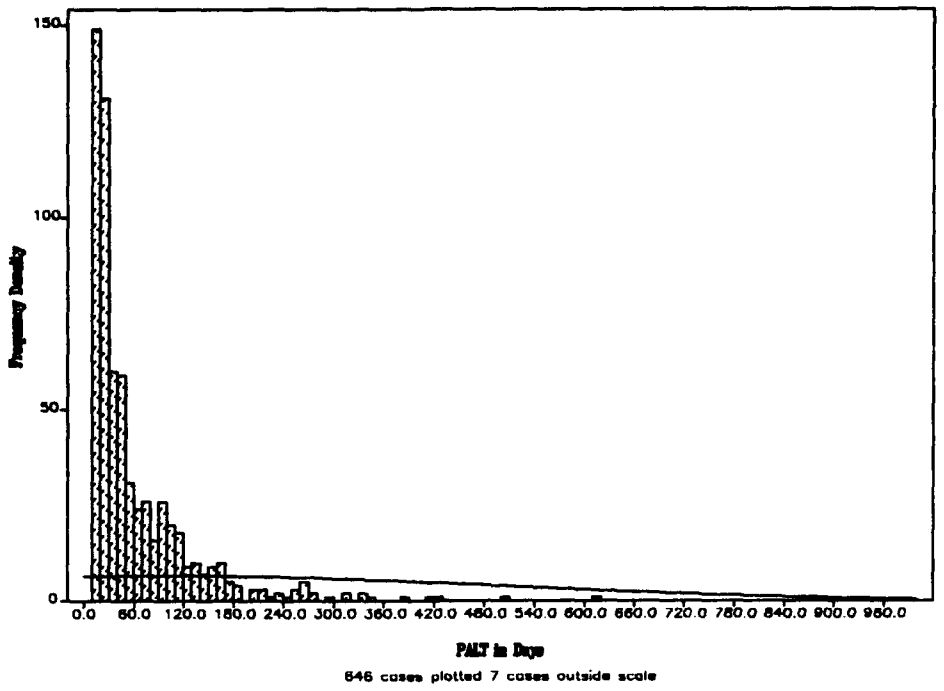

Figure 11: Frequency Histogram of NIPARS PALT

The seven cases that extend beyond 1,000 days are outliers for the NIPARS system and warranted individual treatment. Upon closer examination, ten requisitions were discovered to be orders originally placed with the FMS system and ultimately transferred to NIPARS for satisfaction. These requisitions are not typical of the NIPARS population; consequently, they were removed.

After removing four FMS system requisitions and ten NIPARS requisitions, a second analysis was performed. The results are reproduced in Table 12. The impact of removing outliers from the two distributions was to significantly reduce the skew and kurtosis to levels that permit the descriptive statistics to have more meaning. The second analysis had minimal impact on PLT statistics indicating that PLT had no significant outliers. However, PALT and TPLT statistics were significantly affected

Table 12.

Second Analysis
Descriptive Statistics - Lead Time

	FMS PALT	NIPARS PALT	FMS PLT	NIPARS PLT	FMS TPLT	NIPARS TPLT
N	616	643	616	643	616	643
Lo CI 95%	375.52	56.71	227.28	95.61	612.65	154.99
Mean	394.48	61.59	246.08	102.91	640.46	164.51
Up CI 95%	413.24	66.47	264.87	110.22	668.27	174.02
SD	238.36	63	237.50	94.36	351.46	122.91
Minimum	37	11	0	4	105	21
Median	334	37	162.5	77	540	140
Maximum	1333	423	1205	663	1962	760
Skew	1.36	2.39	1.65	1.95	1.01	1.73
Kurtosis	1.9	7	1.94	5.18	.64	3.79

For example, the mean PALT for NIPARS reduced from 104.5 days to 61.59 days and the kurtosis reduced from a coefficient of 81.89 to 7. Furthermore, the median and the mean approach each other in location; however, their distance is still significant and indicates that the distributions are not normal.

An interesting result derived by eliminating outliers was the minimum impact on the median. For example, the PALT median for the FMS system declined by only one day and the NIPARS median remained constant at 37 days. This result indicates the robust nature of the median as a measure of central tendency and demonstrates the claim that the median is not affected by erratic and extreme values when the sample being compared is approximately the same size (Snedecor and Cochran, 1980:137). Figures 9 and 10 indicate the long positive tails of the FMS and NIPARS PALT distributions. In distributions such as these, the efficacy of the median compared to the mean rises; consequently, the median will be used as the descriptive measure of central tendency in the analysis of lead time performance.

Results - Investigative Question I. Investigative question I seeks to determine if a difference in PALT exists between the median PALT for NSIs procured under NIPARS compared to NSIs procured by the FMS system. Using the descriptive statistics located in Table 12, the median PALT for NIPARS is 37 days compared to a median PALT of 334 days for the FMS procurement system. NIPARS PALT performance exceeds the FMS system PALT performance by an average of 297 days.

To confirm the descriptive results, a median test was performed. The median test is a non parametric test that examines the hypothesis that the medians of the two populations are the same (Seigel, 1992:119). Using the fixed significance level of $\alpha = .05$, a p value greater than .05 requires accepting the null hypothesis (H_o) and a p value lower than .05 requires rejecting the null hypothesis and accepting the alternative hypothesis (H_a).

H_o The median PALT for NIPARS and the FMS system are the same

H_a The median PALT for NIPARS and the FMS system are different

Test Statistic: $X = 884.87$

P value: $P = .00001$

Rejection Region: $P \leq .05$

Conclusion: Fail to accept H_o. The median PALT for NIPARS is different from the median PALT for the FMS system.

The results of the median test clearly support the matched pairs conclusion that the median procurement administrative lead time required to purchase NSIs is significantly higher in the FMS system.

Results - Investigative Question II. Investigative question II seeks to determine if a difference in PLT exists between the median PLT for NSIs procured under NIPARS compared to NSIs procured by the FMS system. Using the descriptive statistics located in Table 12, the median PLT for NIPARS is 77 days compared to a median PLT of 162.5 days for the FMS procurement system. NIPARS PLT performance exceeds the FMS system PLT performance by an average of 85 days. To confirm the descriptive results, a median test was performed.

H_o The median PLT for NIPARS and the FMS system are the same

H_a The median PLT for NIPARS and the FMS system are different

Test Statistic: X = 80.71

P value: P = .00001

Rejection Region: $P \leq .05$

Conclusion: Fail to accept H_o. The median PLT for NIPARS is different from the median PLT for the FMS system.

The results of the median test clearly support the conclusion that the median production lead time required to produce NSIs is higher in the FMS system.

Results - Investigative Question III. Investigative question III seeks to determine if a difference in TPLT exists between the median TPLT for NSIs procured under NIPARS compared to NSIs procured by the FMS system. Using the descriptive statistics located in Table 12, the median TPLT for NIPARS is 140 days compared to a median TPLT of 540 days for the FMS procurement system.

NIPARS TPLT performance exceeds the FMS system TPLT performance by an average of 400 days.

To confirm the descriptive results, a median test was performed.

H_o The median TPLT for NIPARS and the FMS system are the same

H_a The median TPLT for NIPARS and the FMS system are different

Test Statistic: $X = 646.15$

P value: $P = .00001$

Rejection Region: $P \leq .05$

Conclusion: Fail to accept H_o. The median TPLT for NIPARS is different from the median TPLT for the FMS system.

The results of the median test clearly support the conclusion that the median total procurement lead time required to purchase NSIs is significantly higher in the FMS system.

Results - Investigative Question IV. Due to the absence of sufficient lead time data for Australian procurements undertaken by NIPARS, negative results are reported.

Price Analysis

The first analysis of the price data produced surprising results that suggested NIPARS unit prices were significantly less than FMS unit prices. Upon further investigation, the researcher discovered that the SAMIS reported quantities procured for NIPARS requisitions were corrupt; consequently, unit price for NIPARS had to be re calculated and the price analysis re performed.

To determine a reasonably accurate unit price for NIPARS procured items, the SAMIS reported vendor requisition value was divided by the NIPARS reported

quantity procured. The vendor requisition value consists of material cost, overhead and vendor profit. It does not include NIPARS or FMS charges. The resulting unit price was verified, for all requisitions, with the unit price reported by the NIPARS management information system. The result was a matching rate of 100% indicating the integrity of the derived unit price.

Once the researcher was satisfied that the material unit price for NIPARS procured items was correct, the NIPARS unit price (including NIPARS fees) was determined by adding the NIPARS fixed fee and award fee to the vendor's requisition value (provided by SAMIS) and dividing by the quantity procured (provided by the NIPARS contractor). The NIPARS vendor requisition value, fixed fee and award fee data were extracted from the SAMIS data base and the quantity procured was extracted from the NIPARS data base and matched to SAMIS data based on requisition number. That is, 756 NIPARS requisitions were extracted from the SAMIS data base and 785 NIPARS requisitions were extracted from the NIPARS data base. When the two data sets were merged, only 664 NIPARS requisitions were identical between the management information systems. The difficulty with this exercise was that two sources of data were required to be merged to provide the NIPARS price data that would be analysed in this study.

Two types of analysis were performed on the price data. The first analysis took the mean unit price for each NSN and compared the two systems by creating pairs that were matched based on NSN. The price differential that existed between each system was then analysed. The second analysis created three price groups and performed a matched pairs analysis for each group to determine the location of greatest price difference between the two systems.

Unit Price Matched Pairs Analysis

The original data set in the unit price matched pairs analysis consisted of 830 FMS requisitions and 663 NIPARS procured requisitions. This data set was reduced to mean unit prices for 293 NSNs that were common to both systems. For comparison purposes, the unit prices for NSNs that had been procured more than once by either system, were reduced to the average unit price for that NSN. A random check was performed to ascertain the degree of price variability within NSN. The result was a minimal price variation between different purchases of the same item. Multiple procurements of the same item generally occurred within a short time frame of each other. For the small number of NSNs that exhibited some price variation between procurements, this may be due in part to price breaks derived as a result of lot buys or quantity discounts. Taking the mean unit price for multiple procurements of the same item appears to have provided a good approximation of unit price.

The matched pairs data was first analysed to produce descriptive statistics for 293 matched pairs. The results are reproduced in Table 13. The high degree of skew and kurtosis depicted in Table 13 is the result of a small number of extremely high valued items that are distorting the mean. This is indicated by the significant gap between the mean and the median. For example, the mean FMS unit price is $695.50; however, the median is only $93.30. When a distribution is normal, these two indicators of central tendency should be closely located. In this example, the mean is $602.20 greater than the median. The distribution of unit price makes the mean a meaningless statistic; consequently, the median will be used as the indicator of central tendency. The descriptive statistics contained in Table 13 will be used in the following section along with the results of the Wilcoxon Signed Ranks tests that

were performed to provide conclusions for investigative questions V, VI and VII. At this point, it is important to recall that the NIPARS fixed fee and award fee is applied to requisition value and not to unit value; however, the NIPARS unit price and fees field is representative of the requisition value plus NIPARS fees divided by quantity procured.

Table 13

Descriptive Statistics For Price
Based on Matched Pairs

	FMS Unit Price	NIPARS Unit Price	NIPARS Unit Price & Fees	FMS Total Unit Price	NIPARS Total Unit Price
N	293	293	293	293	293
Lo CI 95%	385.14	450.96	505.98	422.11	544.43
Mean	695.50	1,076.00	1141.30	726.26	1,228.10
Up CI 95%	1,005.80	1,701.10	1776.80	1,102.40	1,911.80
SD	2,699.20	5,436.70	5526.30	2,958.30	5,946.30
Minimum	1.06	0.41	2.37	1.16	2.55
Median	93.33	109.76	135.92	102.29	146.25
Maximum	39,760.00	86,460.00	87,660.00	43,570.00	94,320.00
Skew	11.04	13.58	13.47	11.04	13.47
Kurtosis	149.72	206.90	204.33	149.72	204.33

The purpose of the Wilcoxon Signed Ranks test is to determine if NIPARS unit prices are greater than FMS unit prices for pairs matched on NSN.

Results - Investigative Question V. Investigative question V seeks to determine if a difference exists between the material unit price for NSIs procured under NIPARS compared to the material unit price for NSIs procured by the FMS system. In this analysis, material unit price comprises material cost, vendor overhead and vendor profit. Using the descriptive statistics located in Table 13, the median NIPARS unit price is $109.76. This is $16.44 higher than

the median FMS unit price; consequently, the descriptive statistics superficially indicate that NIPARS unit prices are greater than FMS unit prices. Out of 293 matched pairs, NIPARS unit price was less than FMS unit price on 151 occasions and NIPARS unit price was greater than the FMS unit price on 142 occasions. This analysis superficially indicates that NIPARS unit prices are more often cheaper than FMS unit prices; however, this analysis does not take into consideration the magnitude of difference between the matched pairs. This analysis would be misleading if on 151 occasions NIPARS unit prices were only an average of $0.01 less than FMS unit prices and on 142 occasions FMS unit prices were an average of $100.00 less than NIPARS unit prices. To consider the magnitude of difference between NIPARS unit prices and FMS unit prices, the Wilcoxon Signed Ranks test was performed.

H_o The probability distributions for NIPARS unit price and FMS unit price are the same.

H_a The probability distribution for NIPARS unit price is shifted to the right of the probability distribution for FMS unit price.

Test Statistic: T = 16,800

P value: P = .001

Rejection Region: $P \leq .05$

Conclusion: Fail to accept H_o. The probability distribution for NIPARS unit prices is located to the right of the probability distribution for FMS unit prices indicating that NIPARS unit prices are greater than FMS unit prices.

Based on the results of the Wilcoxon Signed Ranks test, the NIPARS unit price significantly exceeds the FMS unit price. This result is seemingly supported by comparing the paired mean unit price for each system. Based on

this comparison, NIPARS unit prices are approximately an average of $ 380.50 greater than FMS unit prices. Appendix C lists the 293 matched pairs used to compare FMS material unit prices to NIPARS material unit prices and provides and indication of the difference in material unit price between each matched pair.

Results - Investigative Question VI. Investigative question VI seeks to determine if a difference exists between the NIPARS unit price (inclusive of fixed fee and award fee) compared to the total unit price for NSIs procured by the FMS system. Using the descriptive statistics located in Table 13, the median NIPARS price is $135.92. This is $33.63 higher than the median FMS total unit price (inclusive of FMS charges); consequently, the descriptive statistics superficially indicate that the NIPARS price is greater than the total FMS unit price. Out of 293 matched pairs, NIPARS unit price was less than FMS unit price on 86 occasions and NIPARS unit price was greater than the FMS unit price on 207 occasions. This analysis superficially indicates that NIPARS prices (inclusive of NIPARS fees) are more often greater than FMS total unit prices (inclusive of FMS charges). To confirm this conclusion, the Wilcoxon Signed Ranks test was performed.

H_o The probability distributions for NIPARS price and FMS total unit price are the same.

H_a The probability distribution for NIPARS price is shifted to the right of the probability distribution for total FMS unit price.

Test Statistic: T = 10,400

P value: P = .00001

Rejection Region: $P \leq .05$

Conclusion: Fail to accept H_O. The probability distribution for NIPARS prices is located to the right of the probability distribution for total FMS unit prices. This result indicates that NIPARS unit prices inclusive of NIPARS fees are greater than total FMS unit prices inclusive of FMS charges.

Based on the results of the Wilcoxon Signed Ranks test, the NIPARS price significantly exceeds the total FMS unit price. This result is seemingly supported by comparing the paired mean unit price for each system. Based on this; comparison, NIPARS unit prices are approximately an average of $379.04 greater than total FMS unit prices. Appendix D lists the 293 matched pairs that compare the FMS total unit price to the NIPARS unit price, including NIPARS fees, and provides the amount of difference for each matched pair.

Results - Investigative Question VII. Investigative question VII seeks to determine if a difference exists between the NIPARS total unit price (inclusive of fixed fee, award fee and FMS charges) compared to the FMS total unit price (inclusive of FMS charges). Using the descriptive statistics located in Table 13, the median NIPARS price is $146.25. This is $43.96 higher than the median FMS total unit price; consequently, the descriptive statistics superficially indicate that the total NIPARS price to the customer is greater than the total FMS unit price to the customer. Out of 293 matched pairs, NIPARS unit price was less than FMS unit price on 68 occasions and NIPARS unit price was greater than the FMS unit price on 225 occasions. This analysis superficially indicates that NIPARS total unit prices are more often greater than FMS total unit prices. To confirm this conclusion, the Wilcoxon Signed Ranks test was performed.

H_O The probability distributions for NIPARS total unit price and FMS total unit price are the same.

H_a The probability distribution for NIPARS total unit price is shifted to the right of the probability distribution for the FMS total unit price.

Test Statistic: T = 7,965.50

P value: P = .00001

Rejection Region: $P \leq .05$

Conclusion: Fail to accept H_o. The probability distribution for NIPARS total unit prices is located to the right of the probability distribution for total FMS unit prices. This result indicates that NIPARS total unit prices, inclusive of NIPARS fees and FMS charges, are greater than total FMS unit prices inclusive of FMS charges.

Based on the results of the Wilcoxon Signed Ranks test, the price of NIPARS items to the FMS customer significantly exceeds the total FMS unit price. This result is seemingly supported by comparing the paired mean total unit price for each system. Based on this comparison, NIPARS total unit prices are approximately an average of $465.84 greater than FMS unit prices. Appendix E lists the 293 matched pairs used to compare FMS total unit prices (inclusive of FMS charges) to NIPARS total unit prices (inclusive of NIPARS fees and FMS charges).

Summary. NIPARS material unit prices, NIPARS unit prices inclusive of fees and NIPARS total unit prices to the FMS customer are significantly higher than FMS material unit prices and FMS total unit prices paid by the FMS customer. Due to the extremely high variation in the data, the mean is not a reliable indicator of the average difference in price and is not used to confirm these conclusions. For each investigative question, descriptive statistics were used to provide an initial comparison between the unit prices of each system. The median unit price was used as the basis for comparison because it is not effected by extreme or wild observations.

In the price data, two records significantly skewed the mean unit price of each system. The NSN and adjusted unit price of these records is provided in Table 14. The outliers provided in Table 14 were retained in the data analysed; however, had they been removed, the FMS mean adjusted unit price would have reduced from $695.50 to $556.22, and the NIPARS mean adjusted unit price would have reduced from $1,076 to $717.74.

Table 14.

Unit Price Outliers

NSN	Adjusted Unit Price		Difference
	FMS $	NIPARS $	$
1560 00 160 4535	2,163	21,301	19,138
1610 00 005 8685	41,251	86,458	45,207

This demonstration indicates the significant effect outliers have on the mean unit price; however, removing the extreme observations does not change the result that NIPARS adjusted unit prices appear to be higher than FMS adjusted unit prices. Furthermore, removing extreme observations has minimal impact on the median, consequently, the median provides a better indication of central tendency than the mean in this analysis.

The degree to which NIPARS median prices exceed FMS median prices and the percentage difference is provided in Table 15.

Unit Price Analysis Based on Grouped and Matched Pairs.

Although the global analysis of all 293 matched pairs indicates that NIPARS prices are significantly higher than FMS prices, the high variability in prices requires further treatment of the matched pairs.

Table 15

Median Difference in Price

	Unit Price	FMS Total Unit Price Vs NIPARS Price	Total Unit Price
Median Difference	$16.43	$33.63	$43.96
% Difference	17.6%	32.87%	42.97%

A close inspection of the relative frequency distributions, for the NIPARS and FMS material unit prices, isolated some loose groups of observations. To meaningfully analyse the unit price data, the NIPARS and FMS unit prices were grouped into common groups based on unit price. These groups for are,

a. prices less than $250,

b. prices between $250 and $2,000, and

c. prices greater than $2,000

The results derived from grouping the data were significant. For example, the mean FMS material unit price before creating price groups was $695.50 and the median was $93.33. Once the price data was grouped, FMS mean unit price for items priced between $0.00 and $250 was $65.43 and the median was more closely located at $36.69. Furthermore, the standard deviation, kurtosis and skew for all variables was significantly reduced.

The descriptive statistics derived from the analysis of matched pairs that are grouped based on price, are provided in the following section along with the results of Wilcoxon Signed Ranks tests that were performed to further support the conclusions for investigative questions V, VI and VII. The purpose of the Wilcoxon Signed Ranks test is to determine if the prices of both systems are equal or different.

Results - Investigative Question V. The analysis that was performed on all 293 matched pairs indicated that NIPARS material unit prices were higher than FMS material unit prices. The descriptive statistics for matched pairs that are grouped into a price category are reproduced in Table 16. The median unit price for groups B and C are significantly higher for NIPARS unit prices than for FMS unit prices. In price group A, the median FMS unit price marginally exceeds the median NIPARS unit price. With the exception of unit prices ranging from $0 to $250 the descriptive statistics superficially indicate that FMS unit prices are less than NIPARS unit prices.

Table 16.

Descriptive Statistics -
Unit Price Groups

FMS	A $0 - $250	B $251 - $2,000	C >$2001
N	197	70	26
Mean	65.43	697.97	5,462.80
SD	74.59	625.54	7,563.80
Median	36.69	492.64	3,176.30

NIPARS	A $0 - $250	B $251 - $2000	C >$2001
N	197	70	26
Mean	63.71	878.16	9,279.40
SD	68.24	617.90	16,310.00
Median	34.12	579.79	4,522.00

Out of 197 matched pairs in price group A, NIPARS unit prices were less than FMS unit prices on 128 occasions and NIPARS unit prices were greater than the FMS unit price on 69 occasions. This analysis superficially indicates that FMS unit prices are more often higher than NIPARS unit prices for items in the

price range $0 to $250. Furthermore, the NIPARS unit prices for matched pairs in price groups B and C were more often greater than FMS unit prices indicating that NIPARS unit prices are more often higher than FMS unit prices for items exceeding $251. To confirm this conclusion, the Wilcoxon Signed Ranks test was performed on each price group.

H_o The probability distributions for NIPARS material unit price and FMS material unit price are the same.

H_a The probability distribution for NIPARS material unit price is different to the probability distribution for the FMS material unit price.

	A	B	C
Test Statistic:	T = - 8241	506	53
P value:	P = .0595	.00001	.00001
Rejection Region:	P ≤ .05	P ≤ .05	P ≤ .05

Conclusion A: Fail to reject H_o. The probability distribution for NIPARS unit prices is the same as the probability distribution for FMS unit prices. This result indicates that NIPARS unit prices are the same as FMS unit prices for items less than $250.

Conclusion B and C: Fail to accept H_o. The probability distribution for NIPARS unit prices is located to the right of the probability distribution for FMS prices. This result indicates that NIPARS unit prices are greater than FMS unit prices for items greater than $250.

Based on the results of the Wilcoxon Signed Ranks test, the material unit price of NIPARS significantly exceeds the FMS material price for items greater than $250. To determine the effects of outliers on the results, the two outliers described in table 14 were removed and the Wilcoxon Signed Ranks test was re performed for prices greater than $2,000. An increased p value of .0058 was

produced indicating that NIPARS unit prices remain higher than FMS unit prices when significant outliers are removed.

Results - Investigative Question VI. The analysis that was performed on all 293 matched pairs indicated that NIPARS prices, inclusive of NIPARS fees, were higher than total FMS unit prices inclusive of FMS charges. The descriptive statistics for matched pairs that are grouped into a price category are reproduced in Table 17. The median unit prices for all groups are significantly higher for NIPARS unit prices than for FMS unit prices; consequently, the descriptive statistics superficially indicate that FMS unit prices, including FMS charges, are less than NIPARS unit prices that include NIPARS fees.

Table 17.

Descriptive Statistics -
Unit Price Groups for NIPARS Price and
Total FMS Unit Price

FMS	A $0 - $250	B $251 - $2,000	C >2001
N	189	71	33
Mean	67.19	617.70	5,054.10
SD	79.35	611.65	7,557.10
Median	36.79	402.69	2,666.90

NIPARS	A $0 - $250	B $251 - $2000	C >$2001
N	189	71	33
Mean	84.73	752.22	8,030.40
SD	68.23	508.04	14,910.00
Median	67.26	498.84	4,212.20

Out of 189 matched pairs in price group A, NIPARS unit prices were less than total FMS unit prices on 62 occasions and NIPARS unit prices were greater than total FMS unit prices on 127 occasions. This analysis superficially indicates

that NIPARS unit prices, inclusive of NIPARS fees, are more often higher than total FMS unit prices for items in the price range $0 to $250. This result is reproduced in similar proportions for price groups B and C. To confirm this conclusion, the Wilcoxon Signed Ranks test was performed on each price group.

H_o The probability distribution for NIPARS unit price, inclusive of NIPARS fees, and FMS total unit price are the same.

H_a The probability distribution for NIPARS unit price, inclusive of NIPARS fees, is shifted to the right of the probability distribution for the FMS total unit price.

	A	B	C
Test Statistic:	T = 5,016.5	506	108
P value:	P = .00001	.00001	.0021
Rejection Region:	$P \leq .05$	$P \leq .05$	$P \leq .05$

Conclusion: Fail to accept H_o for all price groups. The probability distribution for NIPARS unit prices, inclusive of NIPARS fees, is shifted to the right of the probability distribution for total FMS unit prices. This result indicates that NIPARS unit prices, inclusive of NIPARS fees, are higher than total FMS unit prices.

Based on the results of the Wilcoxon Signed Ranks test and the descriptive statistics, NIPARS unit prices, inclusive of NIPARS fees, are significantly higher than total FMS unit prices. This result supports earlier conclusions that resulted from the global matched pairs analysis. To determine the effects of outliers on the results, the two outliers described in Table 14 were removed and the Wilcoxon Signed Ranks test was re performed for prices greater than $2,000. An increased p value of .0063 was produced indicating that NIPARS unit prices, inclusive of NIPARS fees, remain higher than FMS unit prices, inclusive of FMS charges, when significant outliers are removed.

Results - Investigative Question VII. The analysis that was performed on all 293 matched pairs indicated that NIPARS total unit prices, inclusive of NIPARS fees and FMS charges, were higher than total FMS unit prices inclusive of FMS charges. The descriptive statistics for matched pairs that are grouped into a price category are reproduced in Table 18. The median unit prices for all groups are significantly higher for NIPARS unit prices than for FMS unit prices; consequently, the descriptive statistics superficially indicate that total FMS unit prices are less than total NIPARS unit prices.

Table 18.
Descriptive Statistics -
Unit Price Groups for Total NIPARS Unit Price and
Total FMS Unit Price

FMS	A $0 - $250	B $251 - $2,000	C >2001
N	184	75	34
Mean	64.25	582.75	4,935.70
SD	77.48	603.27	7,473.70
Median	33.74	325.88	2,620.10

NIPARS	A $0 - $250	B $251 - $2000	C >$2001
N	184	75	34
Mean	86.59	754.89	8,449.80
SD	68.86	525.24	15,830.00
Median	70.41	462.81	4,454.40

Out of 184 matched pairs in price group A, NIPARS total unit prices were less than total FMS unit prices on 49 occasions and NIPARS unit prices were greater than total FMS unit prices on 135 occasions. This analysis superficially indicates that NIPARS unit prices, inclusive of NIPARS fees and FMS charges, are more often higher than total FMS unit prices for items in the price range $0 to

$250. This result is reproduced in similar proportions for price groups B and C. To confirm this conclusion, the Wilcoxon Signed Ranks test was performed on each price group.

H_o The probability distribution for NIPARS total unit price, inclusive of NIPARS fees and FMS charges, and FMS total unit price are the same.

H_a The probability distribution for NIPARS total unit price, inclusive of NIPARS fees and FMS charges, is shifted to the right of the probability distribution for FMS total unit price.

	A	B	C
Test Statistic:	T = 3,755.00	409	70
P value:	P = .00001	.00001	.0001
Rejection Region:	P ≤ .05	P ≤ .05	P ≤ .05

Conclusion: Fail to accept H_o for all price groups. The probability distribution for NIPARS unit prices, inclusive of NIPARS fees and FMS charges, is shifted to the right of the probability distribution for total FMS unit prices. This result indicates that NIPARS unit prices, inclusive of NIPARS fees and FMS charges, are higher than total FMS unit prices.

Based on the results of the Wilcoxon Signed Ranks test and the descriptive statistics, the NIPARS unit price, inclusive of NIPARS fees and FMS charges, is significantly higher than the total FMS unit price. This result supports earlier conclusion that indicated total NIPARS unit prices are greater than total FMS unit prices. To determine the effects of outliers on the results, the two outliers described in table 14 were removed and the Wilcoxon Signed Ranks test was re performed for prices greater than $2,000. An increased p value of .0003 was produced indicating that NIPARS total unit prices remain higher than FMS total unit prices when significant outliers are removed.

Results - Investigative Question VIII and IX. Due to the absence of sufficient Australian price data for procurements undertaken by NIPARS, negative results are reported.

Population Price Analysis

The extraordinary degree of variation in the raw price data and the difference in the number of available records for each system caused some problems in performing the price analysis of the NIPARS and FMS populations of prices. The population of raw data that was analysed consisted of 664 requisitions procured using NIPARS and 830 requisitions procured using the FMS system. Due to the difference in population size, a Kolmogorov - Smirnov test was performed on the data to determine the agreement between the relative frequency distribution functions of the two populations. That is, the means or medians of the two populations can only be meaningfully compared if the frequency distributions are the same. The Kolmogorov - Smirnov test produced a p value of .00001 indicating that the distributions are indeed different; consequently, the null hypothesis which states that the two frequency distributions are the same, cannot be accepted. The raw data was closely examined to determine the extent of the difference between the distributions. During this examination, the researcher noticed that the FMS data contained a higher proportion of requisitions with unit prices exceeding $10,000. Out of 664 requisitions, NIPARS unit prices exceeded $10,000 on only 6 requisitions; however, out of 830 requisitions FMS unit prices exceeded $10,000 on 24 requisitions. The effect of this inequality was to increase the FMS mean and median unit price significantly beyond that identified in the matched pairs

analysis. To illustrate this point further, Table 19 compares the unit price and number of procurements each system made for three high valued NSNs.

Table 19

Comparison of High Valued NSNs

NSN	FMS Procurements		NIPARS Procurements	
	Price $	Procurements	Price $	Procurements
1610 00 005 8685	38,925 42,251	3 1	86,458	2
6610 00 015 4382	10,940	3	13,298 16,725	1 1
6605 00 938 0182	9,376	6	8,327	1

Table 19 clearly demonstrates that higher valued requisitions were purchased more often using the FMS system than using NIPARS. This was to be expected because the period of observation for the FMS system was significantly greater than the period of observation for NIPARS. Consequently, six requisitions with unit price of $9,376 contribute significantly more to the FMS systems mean unit price than one requisition of $8,327 contributes to the NIPARS mean unit price.

A median test was performed to compare the medians of both systems based on the raw data; however, the results significantly contradicted the results of the matched pairs analysis by indicating that NIPARS unit prices were the same as FMS unit prices. This result was caused by the significant difference in the number of records analysed for each system. This inequality effectively undermines the efficacy of comparing the medians (Conover, 1971:169). Furthermore, the FMS data contained more than twice the number of requisitions with unit prices valued over $10,000. As a result of this preliminary

examination of the raw price data, the researcher decided that a population analysis would not provide a reliable indicator of the performance of NIPARS in comparison to the FMS system; consequently, price differences between the two systems were analysed using only matched pairs.

Contradiction With the De KAM and Tribble Thesis. De KAM and Tribble used a matched pairs experiment to analyse the unit price difference between NIPARS and the FMS system. Based on their analysis, the researchers concluded that 'the majority of NIPARS unit prices are lower than the AFSAC unit price' (de KAM and Tribble, 1992:107). De KAM and Tribble analysed unit price data by performing a Wilcoxon Signed Ranks test to analyse the difference between 336 requisitions procured using NIPARS to identical NSNs procured using the FMS system. They also performed a median test on each population to indicate the significance of the difference between the middle value of each population. The Wilcoxon Signed Ranks test produced a p value of .0054 indicating that NIPARS unit prices were significantly greater than the FMS system's unit price. The researchers then performed a median test and Kolmogorov - Smirnov Test to analyse the difference in median and the relative frequency distributions of the matched data. Both tests produced results that concluded that NIPARS unit prices and the FMS system's unit price are the same. To overcome this contradiction, de KAM and Tribble standardised the data and performed a one tailed t - test on the population of differences between the unit prices of the two systems. De KAM and Tribble decided that this population was normally distributed when limited to those data points greater than minus $2,000 and less than plus $2,000. From the results of this test, the researcher's concluded that NIPARS has lower unit costs.

The results of the present research indicate that NIPARS material unit prices are significantly higher than FMS material unit prices for all items in excess of $250, and NIPARS material unit prices are the same for items that are less than or equal to $250. Furthermore, this study indicates that NIPARS total unit price (inclusive of NIPARS fees and FMS charges) is significantly higher than FMS total unit prices (inclusive of FMS charges) for all price groups. These results clearly contradict the results of the de KAM and Tribble research. De KAM's and Tribble's objective was to directly compare the unit prices of like items procured by each system. Consequently, the focus of the analysis should have been the differences between matched pairs rather than the differences between the median of each population. In the context of their analysis, use of the median test was inappropriate because it does not measure the direction or magnitude of difference between each matched pair. This measure is provided by the Wilcoxon Signed Ranks test.

A further explanation for the contradiction between the present study and the de KAM and Tribble study may lie in the integrity of the data analysed. De KAM and Tribble used price data from SAMIS; however, there is no indication in their research that the anomaly regarding corrupt requisition quantities was detected. Their conclusion that NIPARS prices are lower than FMS prices may have been caused by the use of artificially low NIPARS unit prices. No other explanations can be found by this researcher to explain the significant difference between the results of this study and the results of the de KAM and Tribble study.

Conclusion

Performing an analysis of the NIPARS procurement performance in comparison to the performance of the FMS system proved problematic. Data extracted from the SAMIS data base were corrupt and price data had to be reconstructed using other sources of information. Furthermore, the data exhibited a high degree of variability and were not normally distributed. This created some difficulty when performing a price analysis of the two systems. In addition the analysis of NIPARS performance regarding Australian procurements could not be conducted because insufficient activity had occurred to warrant investigation.

The lead time results from this analysis supported the findings of the de KAM and Tribble thesis, namely that NIPARS lead time performance is superior to the performance of the FMS system when procuring NSIs. The results of the price analysis directly contradicted the results published by the de KAM and Tribble thesis. The results of this research indicate that unit prices of FMS procured items are generally less than unit prices of NIPARS procured items. To a limited degree, the comparison of NIPARS to the FMS system, was dependent on the price range of the items analysed. The significance of the lead time and price analysis results will be discussed further in Chapter VI.

VI. Discussion and Recommendations

Overview

This chapter discusses the statistical data and results provided in Chapter V. The discussion commences with comments and conclusions regarding NIPARS and the FMS systems lead time performance. This section is followed by a discussion of NIPARS performance regarding unit price. In conclusion, recommendations regarding the suitability of the NIPARS program for Australia are provided in addition to recommendations for further research.

NIPARS Lead Time Performance

The NSI procurement lead time performance of NIPARS is substantially superior to the lead time performance of the FMS system. Three lead time variables were analysed in this study. They are Procurement Administrative Lead Time (PALT), Production Lead Time (PLT) and Total Procurement Lead Time (TPLT). For each variable, the performance of NIPARS exceeded the performance of the FMS system.

Investigative Question I. The results contained in Chapter V indicate that the average time taken for the FMS system to administer a nonstandard item to contract, is 334 days. NIPARS performs this service in a significantly shorter time frame of 37 days. These results were confirmed by using a median test to establish the significance of the reported difference between the two systems. The median test reported a significance level of .00001 indicating that there is approximately a 100% probability that NIPARS PALT is superior to the PALT of the FMS system. The same results were produced when NSNs,

common to each system, were matched. In this case, the sign test and Wilcoxon Signed Ranks test confirmed the results of the median test.

An interesting and disturbing observation to result from this analysis relates to the extremely poor performance of the FMS system when procuring nonstandard items. Air Logistic Centres (ALCs) were responsible for procuring NSIs for FMS customers prior to the implementation of the NIPARS program. Based on the available data, the administrative lead time required by ALCs to procure NSI items exceeded 1,000 days on a significant number of cases. Some more glaring examples of extraordinary administrative lead times are listed below.

a. NSN 1610 00 388 8892, PALT = 3,898 days or 10.7 years,

b. NSN 6685 00 551 3814, PALT = 3,916 days or 10.73 years,

c. NSN 6615 00 973 2657, PALT = 4,039 days or 11.07 years, and

d. NSN 1620 00 482 0018, PALT = 4,161 days or 11.4 years.

These outliers are significant because they provide a pertinent point of comparison between the two procurement systems. In contrast to the longest PALT for the FMS system, NIPARS longest reported PALT is 872 days. The FMS customer may have legitimate cause to question the nonstandard support offered by the FMS system when a commercial organisation can administer an item to contract approximately ten times faster than the FMS system.

The extreme difference in PALT between NIPARS and the FMS system may be partly explained by the following factors;

a. NIPARS administrative lead time may be significantly reduced because the NIPARS contractor is able to use sources of supply already located by the FMS system.

b. The NIPARS contractor receives an award fee for each order administered to contract within a specified time period; thus the NIPARS contractor and its personnel are motivated to minimise

procurement administrative lead time. The primary function of ALCs is to provide logistics support for USAF and FMS customers standard spares requirements. Procurement of nonstandard items has been performed as an adjunct to the primary mission of the ALCs. Furthermore, the ALCs do not use an incentive system to promote superior performance; consequently less effort may be expended by ALCs to minimise PALT.

c. ALCs may have consolidated customers common NSI requirements. This activity may delay the administration of requisitions to contract.

d. A further reason may be incompetence in the ALCs.

These questions have not been addressed by this study and are provided as potential explanations for the discrepancy in PALT between NIPARS and the ALCs; however, they have no basis in fact.

Prior to the implementation of NIPARS, the FMS customer paid a percentage of requisition value to the FMS system to provide NSI support. In light of the extraordinarily long administrative lead time required to procure a NSI, the lead time conclusions of this study clearly demonstrate that the FMS customer was not receiving value for money. In terms of administrative lead time performance, NIPARS is providing significantly better value for money than the FMS system.

Investigative Question II. Surprising results were achieved from the analysis of production lead time performance. Intuitively, the researcher anticipated minimal difference between the PLT performance of the two systems. Apart from returning business to a manufacturer and offering financial incentives, the procurement body exercises little direct control over the production scheduling of a manufacturer; consequently the PLT for the two systems was expected to be similar. The results contained in Chapter V indicate that the average production lead time for NSIs provided by the FMS system is 162.5 days. NIPARS production lead time is significantly shorter and requires an

average 77 days. These results were confirmed by using a median test to establish the significance of the reported difference between the two systems. The median test reported a significance level of .00001 indicating that there is approximately a 100% probability that NIPARS PLT is superior to the FMS system. The same results were reproduced when NSNs, common to each system, were matched. In this case, the sign test and Wilcoxon Signed Ranks test confirmed the results of the median test.

A factor that could influence the NIPARS PLT is the award fee that is granted for superior performance. Although PLT is not directly considered when applying the award fee to a customer's requisition, the disbursement of a quarterly award to the NIPARS contractor is subjectively determined by AFSAC on the basis of NIPARS overall supply performance. Consequently, the NIPARS contractor is motivated to constantly improve performance and may engage in hastening practices to reduce production lead times. Furthermore, the NIPARS contractor provides more expeditious payment to vendors than the historically long payment process associated with government procurements. This facet of NIPARS performance may explain why vendors are more cooperative in expediting production of NSIs (Brusky, 1993a:2).

A small proportion of procurements using NIPARS are satisfied by vendors that deal in surplus defence articles resulting from production overruns. This source of procurement may further explain the shorter NIPARS production lead time (Brusky, 1993a:2).

Investigative Question III. For the FMS customer, total procurement lead time is the most important indicator of lead time performance. The lead time required to replenish a customer's stocks drives the inventory that is maintained. Higher levels of inventory have cost implications; consequently,

minimising total procurement lead time is an important consideration for the FMS customer.

The results contained in Chapter V indicate that the average time taken for the FMS system to procure and ship a nonstandard item is 540 days. NIPARS performs this service in a significantly shorter time frame of 140 days. These results were confirmed by using a median test to establish the significance of the reported difference between the two systems. The median test reported a significance level of .00001 indicating that there is approximately a 100% probability that NIPARS TPLT is superior to the FMS system. The sign test and Wilcoxon Signed Ranks test confirmed the results of the median test using pairs of data that were matched on NSN.

The results of the lead time analysis confirms the results produced by the de KAM and Tribble study. Although conducted differently, their conclusion that NIPARS provides superior PALT, PLT and TPLT performance when compared to the FMS system, is consistent with the results of this research.

Investigative Question IV. Due to the limited number of NSIs submitted to NIPARS, an analysis of NIPARS lead time performance regarding Australian requisitions failed to produce meaningful results; consequently, it was not performed.

NIPARS Unit Price Performance

Using economically adjusted prices, there is significant difference between the cost of nonstandard items procured by NIPARS and the cost of nonstandard items procured by the FMS system. Three unit price variables were analysed in this study. They are material unit price, NIPARS price, and total unit price. The material unit prices for NIPARS items were an average $16.43 higher

than FMS material unit prices. Surprising results were obtained when the NIPARS unit prices, inclusive of NIPARS, fees were compared to total FMS unit prices inclusive of FMS charges. NIPARS unit prices were an average $33.63 more expensive than bottom line FMS unit prices. The purpose of this analysis was to compare the price competetiveness of NIPARS as a commercial organisation in competition with the FMS system. Based on the results, NIPARS is a significantly more costly source of NSI procurement than the FMS system. The fin price analysis compared NIPARS total unit prices, inclusive of NIPARS fees and FMS charges, with FMS total unit prices, inclusive of FMS charges. The NIPARS total unit price to the FMS customer is an average $43.96 higher than the FMS total unit price.

To examine the effects of the extreme variability in unit price on the price results, the data was grouped into price ranges based upon careful consideration of the data's relative frequency distribution. The price groups that were individually analysed are,

a. unit prices less than $250,

b. unit prices between $250 and $2,000, and

c. unit prices greater than $2,000

The price analysis on the grouped data considered the direction and magnitude of difference between each matched NSN, along with comparing the medians of each system in each price group. The results of the grouped matched pairs analysis generally confirmed the results of the global matched pairs analysis, namely that NIPARS prices for each variable significantly exceeded FMS prices. The exception to this finding regards material unit prices less than $250. Out of 197 items, NIPARS material unit prices are less than FMS material unit prices on 128 occasions. This superficially indicates that NIPARS

material unit prices are more often lower than FMS material unit prices for NSIs priced under $250. However, this simplified comparison does not account for the magnitude of difference between matched NSNs; consequently, a Wilcoxon Signed Ranks test was performed to indicate the degree of difference. Using a fixed α of .05, the resulting p value of the test was .0595 indicating that the material unit prices are not significantly different between the two systems. Should the reader choose a fixed significance level greater than .0595, he or she would conclude that NIPARS material unit prices are less than FMS material unit prices for NSIs priced less than $250.

Investigative Question V. The results contained in Chapter V indicate that the economically adjusted material unit prices for NIPARS are approximately $16.43 higher than FMS material unit prices. When the data was isolated into price groups, the results revealed that the material unit prices of items costing less than $250 is the same for both systems; however, the material unit prices for NIPARS procured items is higher for procurements over $250. This same result was produced when significant outliers were removed.

This surprising result may have been caused by the FMS system consolidating orders to take advantage of quantity discounts and price breaks associated with lot buys. To examine this possibility, the raw price data was examined to determine if different FMS customers procurements of an NSI were consolidated into one order. The result was that different customer's requirements for the same NSI were frequently consolidated into one procurement by ALCs (separate requisition numbers were provided for each country). Table 20 provides an example of order consolidation.

Although the ALC received the different requisitions approximately four months apart, the FMS customers' requirements were consolidated into one

procurement and processed to the vendor. This practice is contrasted to the NIPARS procurement practice where order consolidation appears to be minimal. As Table 21 indicates, customers orders for the same NSN do not appear to be consolidated unless the orders are received in close proximity to each other.

Table 20

Multiple FMS Procurements of a Sample NSN

NSN	Date on Contract	Date Delivered	Quantity Ordered	Unit Price $	Requisition Value $
1560001093693RD	05/11/89	08/05/89	25	244.97	6,124.25
1560001093693RD	05/11/89	08/05/89	7	244.97	1,714.79

This practice is suggested by the different "on contract" and delivery dates provided for the different orders. According to Table 21, only two orders have the same "on contract" date indicating that orders were consolidated for two out of the twelve requisitions submitted.

Furthermore, a significant difference in unit price exists between the ALC and NIPARS procurement of the same item. For example, the ALC procured 32 items at a unit cost of $244.97 in 1989. Four years later, NIPARS procures 25 of the same item for $686.54 per unit. However, when NIPARS consolidated an order for the same item in the same year, it procured 59 units for a unit cost of approximately $391.27. This simple analysis suggests that the material unit price differential between NIPARS and the FMS system may be partially due to quantity discounts achieved by the ALCs. A conclusion that may be drawn from this observation is that NIPARS appears to trade off quantity discounts for

reduced administrative lead time. Further analysis would be required substantiate this conclusion.

Table 21

Multiple NIPARS Procurements of a Sample NSN

NSN	Date on Contract	Date Delivered	Quantity Ordered	Unit Price $	Requisition Value $
1560001093693RD	07/20/91	01/03/92	15	731.45	10971.80
1560001093693RD	12/03/91	01/22/92	12	430.39	5164.68
1560001093693RD	02/20/92	10/14/92	5	705.88	3529.42
1560001093693RD	03/21/92	10/14/92	5	705.88	3529.41
1560001093693RD	07/01/92	10/14/92	18	705.71	12991.85
1560001093693RD	08/25/92	05/03/93	23	390.97	8992.23
1560001093693RD	05/24/92	04/30/93	24	390.97	9383.29
1560001093693RD	09/28/92	04/26/93	49	391.24	19170.58
1560001093693RD	09/28/92	04/26/93	10	391.27	3912.72
1560001093693RD	11/10/92	04/15/93	25	686.54	17163.46
1560001093693RD	12/29/92	04/15/93	12	687.33	8247.94
1560001093693RD	08/03/92	02/12/93	26	702.59	18267.24

In their research, de KAM and Tribble concluded that the "majority of NIPARS unit prices are lower than the AFSAC unit price" (de KAM and Tribble, 1992:107). This research does not support their conclusion. On the contrary, this research concludes that the majority of NIPARS material unit prices less than $250 are the same as FMS material unit prices and the majority of NIPARS material unit prices above $250 are significantly higher.

Investigative Question VI. The purpose of investigative question VI is to indicate the competetiveness of commercial procurement sources like the NIPARS program in comparison to traditional FMS procurement methods. The analysis attempts to establish if there is a difference between the average NIPARS price, inclusive of NIPARS fees, compared to the average total unit price

of NSIs procured through the FMS system. This comparison permitted NIPARS to be compared to the FMS procurement system independently of the FMS program. This was achieved by comparing the NIPARS unit price, excluding FMS charges, to the FMS unit price, including FMS charges.

The analysis of NIPARS price compared to FMS total unit price produced results similar to the material unit price comparison of investigative question V. The results contained in Chapter V indicate that the economically adjusted prices for NIPARS, inclusive of NIPARS charges, are approximately $33.63 higher than FMS unit prices, inclusive of FMS charges. Approximately 90% of items included in this analysis have a procurement price of $2,000 or less. For this group of unit prices, NIPARS produced average unit prices that are substantially higher than FMS total unit prices. For example, the median NIPARS price for items located in the price group $0 to $250 is $67.26. In comparison, the median FMS total unit price is $36.70. For NSIs with NIPARS prices exceeding $2,000, the NIPARS price is substantially higher than the FMS total unit price. In this analysis, the average NIPARS price was $4,212.20. Compared to the average FMS total unit price of $2,666.90, NIPARS provides an average price that is $1,545.30 higher.

This result was not surprising given that most NSIs procured are less than $2,000. The application of a percentage charge on low cost items has less impact on unit price than the application of a fixed fee. The following example demonstrates this point. NIPARS procured quantity ten of NSN 1560 00 448 6189 at $62.00 per unit and a total vendor requisition value of $620. The fixed fee applied to the requisition was $108.80 and an award fee of $50 was also added. After applying the NIPARS fees, the requisition value was $778.80 and the unit price was $77.80. Had a single unit been purchased, the NIPARS unit

price would be approximately $151.36 ($62 material unit price plus $89.36 fill fee).

If this item was purchased by the FMS system at the same requisition value and unit price, an additional 9.6% would be applied to account for FMS charges; consequently, the requisition value would be $679.52 ($620 + 9.6% of $620) and the unit price would be $67.95. Should a single unit be procured, the total unit price would still be $67.95. As demonstrated in this example, the NIPARS unit price, inclusive of NIPARS fees, is $9.85 higher than the FMS total unit price, inclusive of FMS charges. The NIPARS price would be $4.85 higher if there was no award fee added to the NIPARS requisition value. This example demonstrates that NIPARS price competetiveness is significantly reduced for low cost and low quantity procurements.

Although this result was expected for lower valued NSIs, NIPARS was expected to be cheaper for NSIs valued in excess of $2,000 because the application of fixed fees on high requisition values has less impact on unit prices than the application of a percentage charge. The following case demonstrates this point. In 1992 NIPARS procured quantity 5 of NSN 6610 00 015 4382 at a vendor's requisition value of $68,024 and a material unit price of $13,605. A fixed fee of $308.54 and award fee of $800 was applied to extend the requisition value to $69,132.54 and the unit price to $13,826.50. Assuming that unit price was the same, this item procured through the FMS system would yield an extended requisition value of $74,554.30 (after applying 9.6% for FMS charges) and a unit price of $14,910. In this case, the FMS unit price is greater than the NIPARS unit price by $1,084.36. The results of this study did not produce lower NIPARS prices (inclusive of NIPARS fees) for higher valued NSIs because the material unit cost

of items procured by NIPARS was on average $1,345.70 more expensive than items procured by the FMS system. This difference in material unit price effectively canceled out NIPARS advantage once procurement fees were applied.

Investigative Question VII. Total unit price is the price that the FMS customer is finally billed; consequently, minimisation of this price is important to the FMS customer. The average total unit price for NIPARS requisitioned items proved to be $43.96 higher than total unit FMS prices. This result clearly reflects the impact of the NIPARS fee structure and the addition of FMS case charges on lower priced items. That is, the NIPARS administrative fee component of NIPARS total unit price for lower valued items is proportionally larger than for higher valued NSIs.

Due to the results produced in investigative question VI, the average total unit price for NIPARS NSIs was expected to be significantly higher than the average total unit price for FMS procured items.

The results regarding unit price, and total unit price do not support the conclusions of the de KAM and Tribble study. De KAM and Tribble concluded that 'NIPARS total costs (including economically adjusted unit price, award and processing fees) are lower than AFSAC total costs (including economically adjusted unit price and standard FMS surcharges)' (de KAM and Tribble, 1992:108). The de KAM and Tribble thesis used price data from SAMIS; however, there is no indication in their research that they detected the anomaly in the quantity ordered that was present in the SAMIS data. If this anomaly was undetected by the researchers, then their conclusion that NIPARS prices are lower than the FMS system's prices may have been caused by the use of artificially low NIPARS unit prices.

Investigative Question VIII and IX. Due to the limited number of Australian NSI requisitions submitted to NIPARS, an analysis of NIPARS unit price performance regarding Australian requisitions failed to produce meaningful results; consequently, it was not performed.

Qualification to Price Analysis. In December 1992, an award fee refund of $330,000.00 was made to FMS customers. NIPARS prices, including NIPARS fill fee and award fee, were not adjusted to reflect this refund; however, the financial scope of NIPARS procurement activity is substantial; consequently, the researcher determined that this refund would not significantly impact upon the NIPARS prices and would not bias the results of this study.

Is NIPARS a Suitable Procurement Source For Australia?

In light of Australia's recent procurement of eighteen F111-G aircraft from sales as Excess Defence Articles, there is an increasing requirement for Australia to establish a reliable channel of procurement for defence articles that will be retired from the U.S. defence inventory in the future. An increasing number of standard items are likely to become nonstandard as the U.S. defence draw-down continues. In this climate, the NIPARS program offers a source of procurement where procurement lead time significantly out performs the traditional FMS methods employed to acquire nonstandard items.

In comparison to the standard FMS system used to provide NSI support, the NIPARS system is far superior in lead time performance; however, FMS customers incur a higher unit cost that must be absorbed to pay for improved lead time performance. NIPARS provides tangible cost benefits by providing shorter lead times. In the logistics cycle, shorter lead times can translate into reduced inventory management costs and increased mission capability;

however, the FMS customer must decide if the improved performance is worth the additional cost. That is, is the NIPARS program providing value for money or are the financial and mission capability gains provided by the improved lead time performance offset by the increased cost of NSIs?

Although NIPARS lead time performance is impressive when compared to traditional FMS methods of NSI procurement, NIPARS is not a cost effective source for typical NSI procurement for the Australian Department of Defence. All branches of the Australian Defence Force employ supply and acquisition personnel in the U.S. to provide acquisition and logistics support for all defence activities conducted in the U.S. Furthermore, the Australian Counselor of Defence Acquisition and Logistics (CONDAL) is a sizable procurement organisation that forms the ADF's procurement arm in the U.S. The Royal Australian Air Force (RAAF) directs all spare parts orders (including orders for items that are nonstandard in the U.S. defence inventory) through the RAAF procurement office located in the Australian Embassy in Washington. These orders are routinely processed to Peterson Builders Incorporated (PBI) of Sturgeon Bay, Wisconsin (Marshall, 1993:1). PBI is also subcontracted to SCT, the NIPARS contractor (Air Force, 1992:2). The RAAF procures directly from the NIPARS sub contractor and pays a fixed fee of $68 per line item procured regardless of the quantity purchased or the extended value of the requisition. Furthermore, the Australian Department of Defence performs some procurement directly from vendors thereby avoiding the cumbersome FMS charges and the additional NIPARS fill fee and award fee. At present, the RAAF procurement office is employing a single freelance procurement agent on a trial basis to provide third party logistics support. This trial is in the early stages of performance; consequently, there is no indication of the cost effectiveness of

this measure (Aisthorp, 1993:1). As these procurement approaches indicate, Australia partly uses her own procurement resources in the U.S. and in Australia to by pass 'the middlemen'.

The RAAF did not commence participation in the NIPARS program until 9 June 1992. At 1 July 1993, only 76 NSI requisitions had been processed to NIPARS. Utilising the Australian Defence Force procurement arm in the U.S. seems to be a more cost effective procurement channel for lower value NSI requirements; however, further analysis of Australia's procurement practices is required to confirm this conclusion.

Only 41 of the 76 Australian requisitions processed to NIPARS were workable requisitions, the remainder were canceled by the country. Seventy five percent of these requisitions were priced in excess of $1,000. At 29 June 1993, the total material cost of Australian requisitions processed to NIPARS was $1,385,177.12 and the average requisition value was $37,437. As a percent of material cost, the NIPARS fee for Australian requisitions was only 0.8% .

Australia's requisitioning pattern in the NIPARS program provides a solid example of the conclusion that the impact of NIPARS fees diminishes as requisition value increases. For example, the application of standard FMS case charges to the total material cost procured by Australia results in the addition of $105,273 in FMS case charges. These charges comprises a 3% administration charge, 1.5% contract administration fee and 3.1% logistics surcharge. In comparison, the NIPARS total fill fee is only $11,384.00. Given that the NIPARS contractor performs the acquisition service, the disproportionate difference in cost recovery charges is disturbing and perplexing. The FMS customer may justifiably question this cost element that is designed to recover to the FMS system the cost of performing a limited procurement service.

Superficially, the Australian requisitioning activity with NIPARS seems to indicate that NIPARS is a competitive procurement source for higher valued NSIs. However, NIPARS higher material unit prices and the application of standard FMS case charges to each requisition effectively eliminates NIPARS competitive edge. Without further research, this conclusion cannot be confirmed.

Recommendation

In comparison to the FMS system's support for nonstandard items, NIPARS is providing significantly improved lead time support. While NIPARS, in its present form, is not recommended as a procurement source for FMS customers that maintain acquisition personnel in the U.S., NIPARS does provide an effective source of NSI supply for those FMS customers with limited in country support personnel. For FMS customers without a procurement infrastructure in the U.S., NIPARS provides an excellent item location service and effects procurement in a timely manner.

In addition, NIPARS is an effective procurement source for FMS customers that benefit from the Security Assistance Grant Aid programs. Constrained to using grant funds in FMS programs, these FMS customers are receiving considerably improved NSI support in terms of lead time performance.

NIPARS could provide a significantly more attractive procurement source if it was dislocated from the FMS system. Furthermore, a review of the NIPARS award fee may be warranted because it appears to impact significantly upon the cost of NSIs to FMS customers. The same service could be provided without the addition of standard FMS case charges. This would improve the cost effectiveness of NIPARS as a procurement source.

Conclusion

> . . . . the goal of the NIPARS effort is to improve service to security assistance customer countries, the ILC managers have selected two primary measures of success - fill rate and PALT. (Brusky and Burton, 1990/91:87)

Based on these measures of success, NIPARS is a resounding success. In comparison to the FMS system, NIPARS provides superior nonstandard item support with significantly reduced lead times and cancellation rates. The procurement performance of NIPARS is superior to the performance of the FMS system; however, NIPARS cost performance is inferior to the cost performance of the FMS system.

The concept of NIPARS is an important initiative in the U.S. Department of Defence. NIPARS represents the beginning of a growing trend to shift traditional military support functions into the defence industry where commercial practices and philosophies are exercised in the endeavor to provide defence support. NIPARS is an example of a commercial organisation getting 'the right goods or services to the right place, at the right time' (Ballou, 1992:5); however, given that the yard stick for comparison is a cumbersome and unwieldy defence organisation, the question becomes 'is NIPARS the best example'?

Recommendations for Further Study

A number of potential research areas were isolated by the researcher as this study progressed.

1. An analysis of the efficacy of commercially coordinated procurement programs compared to the existing FMS procurement system would be useful to permit FMS countries to assess the viability of FMS as an efficient procurement option.

2. To assess the effectiveness of Australia's nonstandard item procurement practices, an anlaysis of the difference between NIPARS cost and lead time performance compared to direct procurement from the commercial source would be useful. This study should include some indication of the

total costs associated with maintaining specialised acquisition personnel in country compared to the administrative surcharges applied by a commercial procurement body such as NIPARS. In essence, is it more cost effective for Australia to administer her own procurement of NSIs in the U.S. or should she employ a procurement agency?

3. A comparison of NIPARS lead time performance for nonstandard items and the lead time performance of the FMS system in supplying standard items would be useful.

4. Does the service provided by AFSAC in the NSI procurement process justify the level of FMS charges currently applied to NSI procurements?

Appendix A: Glossary of Acronyms

AAC	- Acquisition Advice Code
ADI	- Australian Defence Industry
AECA	- Arms Export Control Acts
AFIT	- Air Force Institute of Technology
AFLC	- Air Force Logistics Command
AFM 67-1	- USAF Supply Manual
AFMC	- Air Force Materiel Command
AFSAC	- Air Force Security Assistance Command
AFSC	- Air Force Systems Command
ALC	- Air Logistics Center
ARB	- Award Review Board
ATCOM	- Aviation Troop Command
BDI	- Bahan Dennis Inc
CLSSA	- Cooperative Logistics Supply Support Agreement
CMAL 79-1	- Controlled Multiple Address Letter
CONDEPOT	- Contractor Depot Support System
CONUS	- Continental United States
COPAD	- Contractor Operated Parts Depot
CSAF	- Chief of Staff Air Force
CSIS	- Country Standard Item Support
CVC	- Charles V. Clark Company Inc
DCS	- Direct Commercial Sales
DFAS	- Defence Financial Accounting Service
DISAM	- Defense Institute of Security Assistance Management

DLA	- Defense Logistics Agency
DLSC	- Defense Logistics Services Center
DOC ID	- Document Identifier
DOD	- Department of Defense
DSAA	- Defense Security Assistance Agency
DSC	- Defense Supply Center
ESF	- Economic Support Fund
FDO	- Fee Determining Officer
FMFP	- Foreign Military Financing Program
FMS	- Foreign Military Sales
FMSO	- Foreign Military Sales Order
ILC	- International Logistics Centre
IMET	- International Military Education and Training
LOA	- Letter of Offer and Acceptance
LOR	- Letter of Request
MILDEP	- Military Department
MILSTRIP	- Military Standard Requisitioning and Issue Procedure
MMAC	- Material Management Aggregation Code
MOA	- Memorandum of Agreement
NAD	- Northrop Aircraft Division
NATO	- North Atlantic Treaty Organisation
NIPARS	- Nonstandard Item Parts Acquisition and Repair System
NISS	- Nonstandard Item System Support
NMCS	- Not Mission Capable Supply
NSIS	- Nonstandard Item Support

NSI	- Nonstandard Item
NSN	- National Stock Number
PALT	- Procurement Administrative Leadtime
PBI	- Peterson Builders Incorporated
PKO	- Peacekeeping Operations
PLT	- Production Leadtime
RIC	- Router Identification Code
ROD	- Report of Discrepancy
RSAF	- Royal Saudi Air Force
SA	- Security Assistance
SAAC	- Security Assistance Accounting Center
SA-ALC	- San Antonio Air Logistics Center
SAIS	- Security Assistance Impact Study
SAMIS	- Security Assistance Management Information System
SAMM	- Security Assistance Management Manual
SCT	- Systems Control Technology
SIMPAC	- Simplified Acquisition Program - Navy
SNAP	- Simplified Nonstandard Acquisition Program - Army
SOS	- Source of Supply (Code)
SOW	- Statement of Work
TO	- Technical Order
TPLT	- Total Procurement Leadtime
UIG	- United International Group Inc
USA	- U.S. Army
USAF	- United States Air Force
USN	- U.S. Navy

Appendix B: Sample of Corrupt NIPARS Requisitions Reported by SAMIS

Document ID	NSN	SAMIS QTY	NIPARS Fill Fee	SAMIS Reported Req Total	NIPARS QTY	NIPARS Reported Req Total
X4V03160072	5306003695856	21	108.80	300.00	20	300.00
T4V11060003	1560004752012BX	11	332.40	25,670.42	5	25,670.42
S4V22092971	1560001898324LC	3	98.27	555.35	2	555.35
S4V21182971	1560001898324LC	14	99.40	799.92	7	799.92
S4V20782982	1560005103677LC	3	303.54	4,994.27	2	4,994.27
S4V20782976	1560005103677LC	3	303.54	4,994.27	2	4,994.27
S4V20512975	1560001910833LC	3	99.40	100.52	2	100.52
S4V10592967	1560001898324LC	3	108.80	304.89	2	304.89
S4V03182989	1560001898324LC	2	108.80	152.19	1	152.19
Q5V30643003	1560005103677LC	3	222.07	5,221.84	2	5,221.84
Q4V21273002	1560000463794DC	71	98.27	302.65	70	302.65
Q4V13183005	1680004546086	8	303.54	6,453.71	7	6,453.71
Q4V12893004	1560001227391LC	3	102.86	106.97	2	106.97
Q4V11770024	1560000089742LK	3	314.38	7,620.46	2	7,620.46
Q4V11660103	1560001898324LC	3	102.86	388.69	2	388.69
Q4V10240207	1560006258305LK	1	108.80	9.50	1	9.50
Q4V10020568	1560005601396LK	6	332.40	22,721.32	5	22,721.32
Q4V10020210	1560006258305LK	35	108.80	264.00	34	264.00
Q4V02840208	1560006258312LK	51	108.80	1,428.25	50	1,428.25
Q4V02680410	1650004739218CB	12	332.40	3,067.50	11	3,067.50
N4Z12205241	4720005419276	10	102.86	93.33	10	93.33
K4V12850254	4720005419276	115	102.86	925.02	114	925.02
J4V10780392	3020000458195AZ	3	108.80	629.52	2	629.52
H4V21722963	1560005209038LC	2	98.27	75.59	2	75.59
H4V20512968	1560001911401LC	3	99.40	658.40	2	658.40
H4V20512967	1560000255422LC	8	99.40	1,269.67	7	1,269.67
H4V12972961	1560001227384LC	4	102.86	197.51	3	197.51
H4V12452962	1560001227384LC	3	102.86	135.06	2	135.06
H4V10382961	1560005209038LC	3	108.80	155.75	2	155.75
H4422705328	4720005419276	8	89.36	70.32	8	70.32
G4V30642012	5340003410130LK	2	89.36	111.75	1	111.75
G4V30552010	1560006318518LK	2	89.36	106.18	1	106.18
G4V30462012	1620000724995	2	89.36	484.67	1	484.67
G4V30322022	1560006541204LK	1	89.36	47.82	1	47.82
G4V30322013	1560006052642LK	2	89.36	607.87	1	607.87
G4V30322012	1560006052640LK	2	89.36	607.51	1	607.51
G4V30262015	1560005114836LK	2	89.36	101.04	1	101.04
G4423362002	1560005616470LK	21	89.36	1,915.35	20	1,915.35
G4423292005	5330003287783LK	51	89.36	964.05	50	964.05
G4423242012	6140006170084LK	6	222.07	4,715.85	5	4,715.85
G4420222063	1610000058685	2	303.54	86,458.80	1	86,458.80
F9V10312251	1560000244236LC	5	108.80	253.61	4	253.61
F5V22682259	5330005315920LC	48	89.36	24.28	48	24.28
F4V10610523	1560000244236LC	4	102.86	193.30	3	193.30

Document ID	NSN	SAMIS QTY	NIPARS Fill Fee	SAMIS Reported Req Total	NIPARS QTY	NIPARS Reported Req Total
D4V91911216	1620004739371XD	4	102.86	2,281.16	4	2,281.16
D4V20101115	2810001189026PD	21	99.40	2,369.12	20	2,369.12
D4V13361186	2810001189026PD	26	303.54	3,086.69	26	3,086.69
D4V11421226	1650004739766CB	2	102.86	1,349.92	1	1,349.92
D4V11371283	1650004738496CB	3	102.86	138.55	1	138.55
D4V11351281	1560007039264LK	5	102.86	110.69	4	110.69
D4V11342248	5330005155745LC	51	102.86	637.50	50	637.50
D4V11071551	4010002307395LK	4	108.80	110.72	2	110.72
D4V10291225	1620000724995	3	108.80	483.78	1	483.78
D4V10171267	1610003888892	28	108.80	1,796.61	26	1,796.61
D4V10091210	1650004738496CB	3	108.80	163.55	1	163.55
B4V22130051	1560005328454LK	24	98.27	969.70	12	969.70
B4V22110048	1560000244236LC	7	98.27	379.11	6	379.11
B4V21260036	1560005103677LC	4	299.12	10,085.22	4	10,085.22
B4V11330207	1560001910833LC	74	314.38	5,419.36	37	5,419.36
B4V10310207	1560001910833LC	8	108.80	617.26	4	617.26
B4411195804	1005005120608	11	102.86	263.80	10	263.80
A9V03607601	1560001224600DC	6	108.80	136.28	4	136.28
A9V03547601	1560001224600DC	6	108.80	136.04	4	136.04
A5Z23500111	1560003040303DC	15	89.36	175.44	14	175.44
A5Z23450119	2810001182420PD	11	89.36	805.35	10	805.35
A5Z23450106	2810004399830PD	281	89.36	1,804.12	280	1,804.12
A5Z22650102	2810001182420PD	8	89.36	573.46	7	573.46
A5V21500103	1560003040303DC	101	98.27	1,218.31	100	1,218.31
A5V21430116	2810004399830PD	169	98.27	1,084.49	168	1,084.49
A4V30600130	1650004738474CB	11	89.36	521.70	10	521.70
A4V21957608	6130000566718	2	299.12	6,844.21	1	6,844.21
A4V20070531	6685006513385	1	99.40	33.13	1	33.13
A4V20067604	1560007006978LK	7	303.54	17,821.49	6	17,821.49
A4V11150147	1620004820018	2	108.80	252.85	1	252.85
A4V10050042	6220006552078	7	108.80	952.50	6	952.50
A4510855968	5306003695856PT	11	108.80	33.00	11	33.00
A4502357833	5330ND819147PXT	8	108.80	231.40	4	231.40
A4502357832	5330ND819145PXT	10	108.80	71.50	10	71.50
A4502357831	5330ND819142PXT	10	108.80	71.50	10	71.50
A4502357829	5330ND819143PXT	10	108.80	71.50	10	71.50
85V30823351	2810005129725PB	38	89.36	1,294.64	37	1,294.64
85V23573236	2810003108935PB	21	89.36	1,522.89	20	1,522.89
85V23573229	2810001189026PD	41	222.07	4,935.80	40	4,935.80
85V23273304	2810005129725PB	55	89.36	1,104.28	54	1,104.28
85V23273291	2810003108935PB	21	89.36	1,468.17	20	1,468.17
85V22963401	2810005129725PB	29	89.36	631.26	28	631.26
85V22963390	2810003108980PB	14	89.36	1,314.02	13	1,314.02
85V22963389	2810003108935PB	21	89.36	1,462.16	20	1,462.16
85V22363365	2810003108935PB	73	222.07	4,562.60	72	4,562.60
84V22053401	2810003108935PB	5	89.36	255.02	4	255.02
84V21753362	2810003108935PB	110	299.12	3,772.41	55	3,772.41
84V21443304	2810003108980PB	8	98.27	407.00	4	407.00
84V20833342	2810003108980PB	6	99.40	433.93	5	433.93

Appendix C: Unit Price For Pairs Matched by NSN

NSN	FMS Adjusted Unit Price	NIPARS Adjusted Unit Price	Difference in Unit Price
1270009965887CB	3,468.18	1,637.51	1,830.67
1620004820018	2,063.75	259.87	1,803.88
1560004553815LK	9,500.92	7,987.00	1,513.92
6130000566718	8,317.93	6,844.21	1,473.72
1560005103677LC	3,786.96	2,516.00	1,270.96
6605009380182CB	9,377.97	8,327.00	1,050.97
1560004739292LK	4,863.79	4,346.00	517.79
1650000225100CB	1,443.74	970.68	473.06
1660005616843CB	2,475.85	2,041.00	434.85
2840011826214PT	419.32	151.30	268.02
6615008852380CB	1,616.84	1,356.00	260.84
1560008628533LK	635.49	397.48	238.01
1680008767878CB	485.43	282.79	202.64
1560003410141LK	389.25	188.81	200.44
1560008315522LK	264.47	65.87	198.60
2810006148713PB	302.53	129.40	173.13
1630009128133	499.86	342.90	156.96
5999012843317XY	445.80	316.00	129.80
1560008971409LK	236.00	120.21	115.79
2810003108991PB	122.82	38.56	84.26
3010007309837CB	210.19	135.37	74.82
1650000197588CB	430.36	365.68	64.68
1620000724995	550.06	485.49	64.57
6615008852364CB	1,187.52	1,125.00	62.52
1650008322281CB	403.14	340.76	62.38
1560006034692LK	138.15	80.82	57.33
6210012858609XY	56.79	1.23	55.56
5910012848732XY	56.88	1.81	55.07
5999012845239XY	216.81	162.30	54.51
5962012851176XY	259.29	205.06	54.23
5999012862621XY	200.88	149.97	50.91
2810001188821PD	228.90	182.75	46.15
1650004738791CB	90.70	48.05	42.65
6760012862521XY	43.78	1.31	42.47
1560007305284LK	185.62	143.64	41.98
1660008315304CB	818.29	778.42	39.87
2810001189026PD	160.21	121.06	39.15
5999012863805XY	39.69	0.66	39.03
5340012838804XY	129.45	90.44	39.01
5999012845202XY	41.30	2.30	39.00
5895012845205XY	116.69	80.90	35.79

NSN	FMS Adjusted Unit Price	NIPARS Adjusted Unit Price	Difference in Unit Price
1560007056466GB	44.59	10.53	34.06
5895012843185XY	109.54	75.56	33.98
5340011244711LE	162.90	131.47	31.43
1650004739247CB	163.86	133.69	30.17
5999012871104XY	119.62	89.54	30.08
5820012853612XY	139.69	109.76	29.93
1610003888892	100.02	71.02	29.00
5895012843161XY	85.23	57.39	27.84
1650004739261CB	151.83	124.76	27.07
5340012850909XY	54.36	28.69	25.67
5340012850873XY	36.03	11.35	24.68
2915009070529PL	254.11	229.66	24.45
1560001224600DC	59.41	34.99	24.42
5820013021190XY	91.33	66.93	24.40
5950012858510XY	90.80	67.83	22.97
1560003373540LK	184.28	162.01	22.27
1650004738471CB	367.42	347.16	20.26
5895012845206XY	54.09	34.12	19.97
5910012850910XY	22.92	4.44	18.48
5961012827464XY	19.01	1.15	17.86
5935012843221XY	19.15	1.97	17.18
5340012858467XY	24.21	7.07	17.14
5910012852153XY	18.95	1.81	17.14
5340012858554XY	20.25	3.21	17.04
5961012845231XY	18.92	2.06	16.86
1560000463794DC	28.58	13.60	14.98
5930012782469XY	44.24	29.43	14.81
1560006541204LK	61.46	46.74	14.72
1650004739218CB	298.34	283.80	14.54
1660005601359CB	1,672.17	1,657.73	14.44
1270008878574CB	138.96	125.22	13.74
1560001227391LC	68.66	54.97	13.69
1560010772200WF	128.56	114.98	13.58
1650004739564CB	64.32	50.99	13.33
5998012858654XY	26.00	12.74	13.26
2810007864546PB	81.13	68.02	13.11
5999012862413XY	35.95	22.94	13.01
1560005701077LK	106.90	94.32	12.58
5945012845190XY	50.62	38.40	12.22
4820004739219CB	130.51	118.82	11.69
5999012864254XY	112.78	101.38	11.40
1560006258312LK	40.67	29.36	11.31
4920010704380WF	226.30	215.68	10.62
5905012845189XY	20.58	10.36	10.22
5998012858653XY	26.02	16.70	9.32

NSN	FMS Adjusted Unit Price	NIPARS Adjusted Unit Price	Difference in Unit Price
5905012838842XY	10.19	1.07	9.12
5962012570345XY	27.39	18.34	9.05
5340012850879XY	17.65	8.72	8.93
5330010470704CB	37.00	28.63	8.37
5340012851022XY	11.83	3.62	8.21
3120000489108PB	33.00	25.12	7.88
5905012855358XY	10.07	2.47	7.60
5905012855362XY	9.35	2.06	7.29
6685006513385	40.32	33.13	7.19
5355012850937XY	8.50	1.32	7.18
5330005155745LC	20.24	13.10	7.14
5910012863771XY	14.42	7.32	7.10
5950012845236XY	14.15	7.15	7.00
4010002307395LK	63.84	56.90	6.94
6110012845200XY	58.56	51.80	6.76
1560006506833LK	42.85	36.20	6.65
5340012850878XY	20.62	14.14	6.48
5961012843259XY	9.30	3.12	6.18
5340012855281XY	14.47	8.47	6.00
5962012827475XY	7.39	1.48	5.91
5930012858501XY	8.77	3.04	5.73
5340012838835XY	7.43	1.89	5.54
5999012850872XY	21.05	16.20	4.85
1560005456570LK	27.34	22.56	4.78
5962012827470XY	5.18	0.41	4.77
5905012855360XY	5.97	1.23	4.74
1560006113817LK	33.00	28.26	4.74
5905012855359XY	5.94	1.23	4.71
5905012855357XY	5.88	1.23	4.65
5905012855361XY	5.88	1.23	4.65
2810003108935PB	73.00	68.42	4.58
5910012848730XY	6.83	2.30	4.53
5910012855302XY	5.29	0.90	4.39
5305012876035XY	5.91	1.56	4.35
5910012848728XY	5.61	1.32	4.29
2810005129725PB	27.81	23.59	4.22
5961012852178XY	5.45	1.32	4.13
5930006106330LK	227.63	223.54	4.09
1560003283031LK	470.35	466.29	4.06
5965012863812XY	11.11	7.09	4.02
591001284872	5.02	1.15	3.87
6615008315803CB	19.04	15.20	3.84

NSN	FMS Adjusted Unit Price	NIPARS Adjusted Unit Price	Difference in Unit Price
6150012855315XY	12.43	8.96	3.47
1560006504121LK	24.64	21.26	3.38
5910012863772XY	4.08	0.74	3.34
6695008102708CB	189.42	186.16	3.26
5905012855356XY	6.05	2.88	3.17
5961012852172XY	4.12	0.99	3.13
5905012862453XY	6.14	3.04	3.10
5962012852189XY	15.55	12.58	2.97
2810001189413PD	5.25	2.56	2.69
6145012843223XY	8.13	5.76	2.37
6145012838815XY	5.72	3.37	2.35
5961012852173XY	4.08	1.81	2.27
5999012852151XY	13.53	11.26	2.27
5961012855408XY	7.58	5.43	2.15
5961012843260XY	4.08	1.97	2.11
5910012843166XY	6.30	4.19	2.11
6145012838816XY	5.76	3.70	2.06
5961012845232XY	2.98	1.15	1.83
5910012859454XY	3.97	2.30	1.67
1650004738792CB	91.84	90.55	1.29
5330005315920LC	1.06	0.51	0.55
5306003695856PT	3.30	3.08	0.22
4720005419276	8.88	8.84	0.04
4730008981273LK	59.28	59.36	(0.08)
2810004399830PD	5.63	6.38	(0.75)
2810003108980PB	95.54	97.31	(1.77)
1560007305482LK	10.83	13.70	(2.87)
5330005850801LK	9.63	12.74	(3.11)
5340010575505PT	2.04	5.17	(3.13)
3120004783848RD	36.69	40.56	(3.87)
1560006761357LK	6.38	11.14	(4.76)
1560006258305LK	3.64	8.87	(5.23)
4010009433499LK	93.33	98.72	(5.39)
5330ND819142PXT	1.09	7.15	(6.06)
5330ND819145PXT	1.09	7.15	(6.06)
5330ND819143PXT	1.09	7.15	(6.06)
6610008767788CB	111.65	118.82	(7.17)
1560006904106LK	15.75	23.13	(7.38)
4010008697823LK	104.38	112.11	(7.73)
1560002226976RD	27.42	35.61	(8.19)
1560005328454LK	72.54	80.81	(8.27)
1560005209038LC	49.61	58.92	(9.31)
5940001400587CB	44.68	54.31	(9.63)
5330003287783LK	9.12	18.85	(9.73)

NSN	FMS Adjusted Unit Price	NIPARS Adjusted Unit Price	Difference in Unit Price
1560003367520LK	5.81	16.73	(10.92)
2995008720237XV	223.27	234.25	(10.98)
1560003385271LK	16.34	28.45	(12.11)
1005005120608	13.82	26.72	(12.90)
1680008322194CB	410.68	424.08	(13.40)
1560003406177LK	197.03	210.81	(13.78)
1560005616470LK	65.24	79.88	(14.64)
5330005313037LK	8.28	24.27	(15.99)
2810001182420PD	72.51	88.90	(16.39)
1560005347246LK	108.91	125.91	(17.00)
5910012863778XY	5.70	22.92	(17.22)
5330005314765LK	11.67	29.54	(17.87)
1560007039264LK	5.05	26.33	(21.28)
6685007949187CB	3,110.30	3,133.00	(22.70)
2810007704694PB	17.12	40.38	(23.26)
5330009617983CB	17.89	41.20	(23.31)
5915012843181XY	5.62	29.02	(23.40)
6685011358557CB	16.36	40.77	(24.41)
1560005945551LK	84.97	109.47	(24.50)
3040009914521CB	275.03	300.83	(25.80)
1560005114836LK	71.62	98.77	(27.15)
1650004738496CB	107.07	136.70	(29.63)
1680012801259WF	129.11	158.75	(29.64)
1650004738474CB	22.64	52.40	(29.76)
1560004486189RD	33.57	64.09	(30.52)
1560000347619LK	179.82	210.99	(31.17)
1560003971196RD	244.70	277.30	(32.60)
1650004739241CB	742.57	776.40	(33.83)
6220005560697	49.50	83.62	(34.12)
2915000770054PL	89.29	126.90	(37.61)
1560003259529RD	139.17	177.07	(37.90)
1650004730544CB	335.73	375.04	(39.31)
1560009944153LK	137.76	181.87	(44.11)
5330ND819147PXT	13.21	57.85	(44.64)
1560000034531RD	214.87	260.31	(45.44)
3020005281260AZ	749.95	797.14	(47.19)
1560011031966WF	108.27	156.34	(48.07)
5360006511736RD	4.47	62.00	(57.53)
1650010138164LK	182.82	241.19	(58.37)
6685007563137CB	456.55	516.57	(60.02)
1650008628488CB	245.88	308.13	(62.25)
6115008873177CB	106.81	169.41	(62.60)
1560000256067RD	113.91	177.51	(63.60)
1560003409953LK	62.43	128.47	(66.04)

NSN	FMS Adjusted Unit Price	NIPARS Adjusted Unit Price	Difference in Unit Price
3020008259219CB	97.62	165.90	(68.28)
6130005646461CB	4,212.75	4,284.00	(71.25)
1560006052640LK	230.56	305.47	(74.91)
1560002194518RD	35.87	118.37	(82.50)
5340003410130LK	26.27	109.24	(82.97)
5975000229562	53.85	137.92	(84.07)
6610008529636LK	1,207.15	1,293.00	(85.85)
1630009636219CB	48.47	140.06	(91.59)
1560006318518LK	9.82	103.79	(93.97)
1560010772199WF	59.63	155.60	(95.97)
6610006906376CB	220.14	320.78	(100.64)
1560005332589LK	239.00	344.03	(105.03)
1560008752908LK	137.66	243.25	(105.59)
1560001898324LC	73.53	180.96	(107.43)
1560005168732RD	103.91	214.41	(110.50)
6240013193699XY	87.60	200.41	(112.81)
6220006552078	49.61	163.16	(113.55)
1560000293882RD	60.74	174.92	(114.18)
4730007041652LK	145.94	268.27	(122.33)
1680007082476	297.33	443.75	(146.42)
5340003410078LK	160.01	309.89	(149.88)
1560000735998LK	1,782.13	1,937.60	(155.47)
1680007109749	95.03	250.98	(155.95)
3040001092975RD	84.94	248.26	(163.32)
6605009618145CB	119.49	284.55	(165.06)
1270007167623CB	704.07	879.42	(175.35)
6105009275039BD	189.15	365.40	(176.25)
3020000458195AZ	145.73	323.49	(177.76)
6625010160965	816.83	1,016.67	(199.84)
1680008175916CB	721.95	921.88	(199.93)
1560006052642LK	138.47	344.15	(205.68)
1560012729639WF	62.81	278.40	(215.59)
2915010924448	920.88	1,143.20	(222.32)
1650009780195CB	1,002.19	1,231.78	(229.59)
1560007657643LK	244.00	492.76	(248.76)
6130008907733CB	1,375.14	1,626.00	(250.86)
1620004739371XW	271.57	570.29	(298.72)
5950008645198LK	146.36	445.57	(299.21)
1560001093693RD	268.76	569.86	(301.10)
2915005625507PL	146.23	455.12	(308.89)
1560007657642LK	259.67	589.29	(329.62)
5905008743084CB	762.38	1,113.00	(350.62)
1650008628468CB	1,260.95	1,703.00	(442.05)
1670007970137LG	593.65	1,105.63	(511.98)

NSN	FMS Adjusted Unit Price	NIPARS Adjusted Unit Price	Difference in Unit Price
1680001795314	884.21	1,408.37	(524.16)
1560000089742LK	3,242.40	3,810.23	(567.83)
1560004203199LK	3,925.27	4,500.00	(574.73)
1680008322193CB	886.00	1,500.00	(614.00)
1660007305761CB	2,311.33	2,930.00	(618.67)
1680004546086	206.44	901.23	(694.79)
2810007226702PB	888.54	1,621.24	(732.70)
5895002393841CB	688.83	1,445.00	(756.17)
6610008761908CB	234.57	1,021.00	(786.43)
1650009923753CB	503.43	1,295.00	(791.57)
6615008076571CB	1,650.17	2,450.00	(799.83)
6615008040301CB	1,127.61	1,942.00	(814.39)
6615008040265CB	2,347.94	3,213.00	(865.06)
6615008220449CB	1,529.15	2,395.00	(865.85)
6130004330386ZW	937.51	1,843.00	(905.49)
6605007544931CB	1,012.87	1,924.00	(911.13)
1680010534209WF	2,693.51	3,808.72	(1,115.21)
1560005601396LK	3,412.70	4,544.00	(1,131.30)
1650004739766CB	205.72	1,387.00	(1,181.28)
1560010450500WF	566.95	1,915.00	(1,348.05)
1560005616427LK	1,477.29	2,835.00	(1,357.71)
1560007006978LK	1,529.15	2,990.00	(1,460.85)
6105009829273UH	1,719.55	3,191.99	(1,472.44)
6680011708405	1,882.17	3,507.46	(1,625.29)
1620008913685	7,961.78	9,785.92	(1,824.14)
1560004752012BX	2,433.35	5,134.08	(2,700.73)
6115011065494LK	1,922.89	5,787.00	(3,864.11)
6610000154382CB	10,940.59	15,011.00	(4,070.41)
1730010893872	1,649.68	5,826.84	(4,177.16)
6615007665804CB	6,734.16	12,010.00	(5,275.84)
1650010553555	758.17	7,665.53	(6,907.36)
1560001604535LK	2,163.82	20,820.00	(18,656.18)
1610000058685	39,757.17	86,458.87	(46,701.70)
Total Difference			(111,508.49)
Average Difference			(380.58)

Appendix D: Total FMS Unit Price And NIPARS Unit Price for Pairs Matched by NSN

NSN	Total FMS Unit Price	NIPARS Unit Price (Plus Fees)	Difference (Ttoal FMS - NIPARS)
1270009965887CB	3,801.13	1,805.65	1,995.48
1620004820018	2,261.87	381.96	1,879.91
1560004553815LK	10,413.00	8,182.73	2,230.27
6130000566718	9,116.45	7,243.33	1,873.12
1560005103677LC	4,150.50	2,700.96	1,449.54
6605009380182CB	10,278.25	8,743.40	1,534.85
1560004739292LK	5,330.71	4,517.24	813.47
1650000225100CB	1,582.34	1,017.55	564.79
1660005616843CB	2,713.53	2,132.80	580.73
2840011826214PT	459.57	196.93	262.64
6615008852380CB	1,772.06	1,440.60	331.46
1560008628533LK	696.49	430.12	266.37
1680008767878CB	532.03	305.85	226.18
1560003410141LK	426.61	221.54	205.07
1560008315522LK	289.86	77.17	212.69
2810006148713PB	331.57	168.68	162.89
1630009128133	547.85	367.57	180.28
5999012843317XY	488.60	397.38	91.22
1560008971409LK	258.65	141.07	117.58
2810003108991PB	134.61	43.85	90.76
3010007309837CB	230.37	181.49	48.88
1650000197588CB	471.68	398.32	73.36
1620000724995	602.86	592.17	10.69
6615008852364CB	1,301.53	1,182.65	118.88
1650008322281CB	441.84	408.16	33.68
1560006034692LK	151.41	97.87	53.54
6210012858609XY	62.24	57.14	5.10
5910012848732XY	62.34	113.63	(51.29)
5999012845239XY	237.62	180.44	57.18
5962012851176XY	284.19	223.19	61.00
5999012862621XY	220.16	183.52	36.64
2810001188821PD	250.87	287.15	(36.28)
1650004738791CB	99.41	58.24	41.17
6760012862521XY	47.99	57.21	(9.22)
1560007305284LK	203.44	154.55	48.89
1660008315304CB	896.85	878.74	18.11
2810001189026PD	175.59	139.15	36.44
5999012863805XY	43.50	56.57	(13.07)
5340012838804XY	141.88	108.58	33.30

NSN	Total FMS Unit Price	NIPARS Unit Price (Plus Fees)	Difference (Ttoal FMS - NIPARS)
5999012845202XY	45.26	114.12	(68.86)
5895012845205XY	127.89	99.04	28.85
1560007056466GB	48.87	22.13	26.74
5895012843185XY	120.05	93.69	26.36
5340011244711LE	178.54	177.59	0.95
1650004739247CB	179.60	156.80	22.80
5999012871104XY	131.10	107.67	23.43
5820012853612XY	153.10	127.90	25.20
1610003888892	109.62	77.29	32.33
5895012843161XY	93.41	75.52	17.89
1650004739261CB	166.40	146.84	19.56
5340012850909XY	59.57	49.04	10.53
5340012850873XY	39.49	67.26	(27.77)
2915009070529PL	278.51	244.00	34.51
1560001224600DC	65.12	65.51	(0.39)
5820013021190XY	100.10	85.06	15.04
5950012858510XY	99.52	88.18	11.34
1560003373540LK	201.98	196.72	5.26
1650004738471CB	402.69	365.57	37.12
5895012845206XY	59.29	47.69	11.60
5910012850910XY	25.12	116.26	(91.14)
5961012827464XY	20.83	13.58	7.25
5935012843221XY	20.99	113.79	(92.80)
5340012858467XY	26.54	19.50	7.04
5910012852153XY	20.77	113.63	(92.86)
5340012858554XY	22.20	12.52	9.68
5961012845231XY	20.74	113.87	(93.13)
1560000463794DC	31.32	28.25	3.07
5930012782469XY	48.49	43.00	5.49
1560006541204LK	67.36	134.10	(66.74)
1650004739218CB	326.98	321.34	5.64
1660005601359CB	1,832.70	1,724.99	107.71
1270008878574CB	152.30	178.19	(25.89)
1560001227391LC	75.25	112.97	(37.72)
1560010772200WF	140.90	174.58	(33.68)
1650004739564CB	70.50	55.14	15.36
5998012858654XY	28.50	31.38	(2.88)
2810007864546PB	88.91	86.45	2.46
5999012862413XY	39.40	36.51	2.89
1560005701077LK	117.16	114.11	3.05
5945012845190XY	55.48	51.96	3.52
4820004739219CB	143.05	131.90	11.15
5999012864254XY	123.61	119.26	4.35
1560006258312LK	44.58	32.63	11.95

NSN	Total FMS Unit Price	NIPARS Unit Price (Plus Fees)	Difference (Ttoal FMS - NIPARS)
49200107043 80WF	248.02	227.08	20.94
5905012845189XY	22.56	22.78	(0.22)
5998012858653XY	28.52	35.34	(6.82)
5905012838842XY	11.16	19.71	(8.55)
5962012570345XY	30.02	23.78	6.24
5340012850879XY	19.34	18.89	0.45
5330010470704CB	40.55	39.17	1.38
5340012851022XY	12.96	12.94	0.02
3120000489108PB	36.17	40.33	(4.16)
5905012855358XY	11.03	7.13	3.90
5905012855362XY	10.24	6.71	3.53
6685006513385	44.19	132.53	(88.34)
5355012850937XY	9.32	5.46	3.86
5330005155745LC	22.18	16.25	5.93
5910012863771XY	15.81	12.40	3.41
5950012845236XY	15.51	19.58	(4.07)
4010002307395LK	69.97	117.94	(47.97)
6110012845200XY	64.18	65.36	(1.18)
1560006506833LK	46.96	45.80	1.16
5340012850878XY	22.60	24.32	(1.72)
5961012843259XY	10.19	65.25	(55.06)
5340012855281XY	15.86	17.79	(1.93)
5962012827475XY	8.10	13.90	(5.80)
5930012858501XY	9.61	7.70	1.91
5340012838835XY	8.14	14.32	(6.18)
5999012850872XY	23.07	29.76	(6.69)
1560005456570LK	29.96	26.84	3.12
5962012827470XY	5.68	12.84	(7.16)
5905012855360XY	6.55	113.05	(106.50)
1560006113817LK	36.17	37.66	(1.49)
5905012855359XY	6.51	113.05	(106.54)
5905012855357XY	6.45	113.05	(106.60)
5905012855361XY	6.45	113.05	(106.60)
2810003108935PB	80.01	76.83	3.18
5910012848730XY	7.49	8.51	(1.02)
5910012855302XY	5.80	4.63	1.17
5305012876035XY	6.48	113.38	(106.90)
5910012848728XY	6.15	7.53	(1.38)
2810005129725PB	30.48	28.51	1.97
5961012852178XY	5.97	38.59	(32.62)
5930006106330LK	249.49	257.58	(8.09)
1560003283031LK	515.51	509.81	5.70
5965012863812XY	12.18	19.52	(7.34)
5910012848727XY	5.50	7.36	(1.86)

NSN	Total FMS Unit Price	NIPARS Unit Price (Plus Fees)	Difference (Ttoal FMS - NIPARS)
6615008315803CB	20.87	18.58	2.29
6150012855315XY	13.62	27.60	(13.98)
1560006504121LK	27.01	29.29	(2.28)
5910012863772XY	4.47	5.40	(0.93)
6695008102708CB	207.60	235.63	(28.03)
5905012855356XY	6.63	58.79	(52.16)
5961012852172XY	4.52	10.30	(5.78)
5905012862453XY	6.73	114.86	(108.13)
5962012852189XY	17.05	17.67	(0.62)
2810001189413PD	5.76	7.74	(1.98)
6145012843223XY	8.91	18.18	(9.27)
6145012838815XY	6.26	15.80	(9.54)
5961012852173XY	4.47	4.91	(0.44)
5999012852151XY	14.83	21.44	(6.61)
5961012855408XY	8.31	14.74	(6.43)
5961012843260XY	4.47	8.19	(3.72)
5910012843166XY	6.90	116.01	(109.11)
6145012838816XY	6.32	16.12	(9.80)
5961012845232XY	3.27	7.36	(4.09)
5910012859454XY	4.35	8.51	(4.16)
1650004738792CB	100.66	101.19	(0.53)
5330005315920LC	1.16	2.37	(1.21)
5306003695856PT	3.62	13.25	(9.63)
4720005419276	9.73	16.83	(7.10)
4730008981273LK	64.97	89.88	(24.91)
2810004399830PD	6.17	6.94	(0.77)
2810003108980PB	104.71	118.09	(13.38)
1560007305482LK	11.87	22.35	(10.48)
5330005850801LK	10.55	16.71	(6.16)
5340010575505PT	2.23	6.73	(4.50)
3120004783848RD	40.21	48.71	(8.50)
1560006761357LK	6.99	19.94	(12.95)
1560006258305LK	3.99	66.58	(62.59)
4010009433499LK	102.29	108.60	(6.31)
5330ND819142PXT	1.19	18.03	(16.84)
5330ND819145PXT	1.19	18.03	(16.84)
5330ND819143PXT	1.19	18.03	(16.84)
6610008767788CB	122.37	178.16	(55.79)
1560006904106LK	17.27	30.59	(13.32)
4010008697823LK	114.40	130.29	(15.89)
1560002226976RD	30.05	45.50	(15.45)
1560005328454LK	79.50	91.08	(11.58)
1560005209038LC	54.38	114.01	(59.63)
5940001400587CB	48.96	73.64	(24.68)

NSN	Total FMS Unit Price	NIPARS Unit Price (Plus Fees)	Difference (Ttoal FMS - NIPARS)
5330003287783LK	9.99	21.08	(11.09)
1560003367520LK	6.36	20.29	(13.93)
2995008720237XV	244.70	288.66	(43.96)
1560003385271LK	17.90	42.01	(24.11)
1005005120608	15.15	36.37	(21.22)
1680008322194CB	450.11	463.39	(13.28)
1560003406177LK	215.94	227.91	(11.97)
1560005616470LK	71.50	86.92	(15.42)
5330005313037LK	9.07	26.27	(17.20)
2810001182420PD	79.47	128.66	(49.19)
1560005347246LK	119.37	136.54	(17.17)
5910012863778XY	6.25	134.74	(128.49)
5330005314765LK	12.79	31.66	(18.87)
1560007039264LK	5.54	41.56	(36.02)
6685007949187CB	3,408.90	3,244.73	164.17
2810007704694PB	18.77	47.86	(29.09)
5330009617983CB	19.61	46.64	(27.03)
5915012843181XY	6.16	42.59	(36.43)
6685011358557CB	17.93	81.47	(63.54)
1560005945551LK	93.13	144.27	(51.14)
3040009914521CB	301.43	355.04	(53.61)
1560005114836LK	78.49	190.03	(111.54)
1650004738496CB	117.34	219.30	(101.96)
1680012801259WF	141.50	253.11	(111.61)
1650004738474CB	24.81	81.04	(56.23)
1560004486189RD	36.79	77.69	(40.90)
1560000347619LK	197.08	239.69	(42.61)
1560003971196RD	268.19	313.52	(45.33)
1650004739241CB	813.86	822.60	(8.74)
6220005560697	54.26	92.14	(37.88)
2915000770054PL	97.86	135.92	(38.06)
1560003259529RD	152.53	192.49	(39.96)
1650004730544CB	367.96	427.83	(59.87)
1560009944153LK	150.98	202.27	(51.29)
5330ND819147PXT	14.48	87.55	(73.07)
1560000034531RD	235.50	300.21	(64.71)
3020005281260AZ	821.94	841.92	(19.98)
1560011031966WF	118.66	165.23	(46.57)
5360006511736RD	4.89	77.88	(72.99)
1650010138164LK	200.37	263.12	(62.75)
6685007563137CB	500.37	673.67	(173.30)
1650008628488CB	269.48	357.08	(87.60)
6115008873177CB	117.07	196.62	(79.55)
1560000256067RD	124.84	204.71	(79.87)

NSN	Total FMS Unit Price	NIPARS Unit Price (Plus Fees)	Difference (Ttoal FMS - NIPARS)
1560003409953LK	68.43	155.67	(87.24)
3020008259219CB	106.99	176.91	(69.92)
6130005646461CB	4,617.17	4,831.74	(214.57)
1560006052640LK	252.69	353.17	(100.48)
1560002194518RD	39.31	131.72	(92.41)
5340003410130LK	28.79	201.48	(172.69)
5975000229562	59.02	151.35	(92.33)
6610008529636LK	1,323.04	1,393.27	(70.23)
1630009636219CB	53.13	150.46	(97.33)
1560006318518LK	10.76	195.05	(184.29)
15600107721 99WF	65.35	192.95	(127.60)
6610006906376CB	241.28	380.52	(139.24)
1560005332589LK	261.95	360.44	(98.49)
1560008752908LK	150.88	257.18	(106.30)
1560001898324LC	80.59	244.55	(163.96)
1560005168732RD	113.88	242.32	(128.44)
6240013193699XY	96.01	316.40	(220.39)
6220006552078	54.38	190.36	(135.98)
1560000293882RD	66.57	196.44	(129.87)
4730007041652LK	159.95	312.87	(152.92)
1680007082476	325.88	476.28	(150.40)
5340003410078LK	175.37	359.04	(183.67)
1560000735998LK	1,953.21	2,020.80	(67.59)
1680007109749	104.16	287.73	(183.57)
3040001092975RD	93.10	275.29	(182.19)
6605009618145CB	130.96	307.87	(176.91)
1270007167623CB	771.66	918.78	(147.12)
6105009275039BD	207.31	392.75	(185.44)
3020000458195AZ	159.71	405.10	(245.39)
6625010160965	895.25	1,141.07	(245.82)
1680008175916CB	791.25	1,003.48	(212.23)
1560006052642LK	151.77	392.93	(241.16)
1560012729639WF	68.84	362.75	(293.91)
2915010924448	1,009.28	1,277.71	(268.43)
1650009780195CB	1,098.40	1,282.22	(183.82)
1560007657643LK	267.42	571.32	(303.90)
6130008907733CB	1,507.15	1,724.78	(217.63)
1620004739371XW	297.64	612.31	(314.67)
5950008645198LK	160.41	498.84	(338.43)
1560001093693RD	294.56	604.39	(309.83)
2915005625507PL	160.27	500.55	(340.28)
1560007657642LK	284.60	698.83	(414.23)
5905008743084CB	835.56	1,231.92	(396.36)
1650008628468CB	1,382.00	1,799.20	(417.20)

NSN	Total FMS Unit Price	NIPARS Unit Price (Plus Fees)	Difference (Ttoal FMS - NIPARS)
1670007970137LG	650.64	1,182.06	(531.42)
1680001795314	969.10	1,455.79	(486.69)
1560000089742LK	3,553.67	4,067.42	(513.75)
1560004203199LK	4,302.09	4,667.50	(365.41)
1680008322193CB	971.06	1,570.94	(599.88)
1660007305761CB	2,533.22	3,063.99	(530.77)
1680004546086	226.25	954.79	(728.54)
2810007226702PB	973.83	1,699.17	(725.34)
5895002393841CB	754.96	1,550.57	(795.61)
6610008761908CB	257.09	1,159.42	(902.33)
1650009923753CB	551.76	1,362.41	(810.65)
6615008076571CB	1,808.58	2,555.98	(747.40)
6615008040301CB	1,235.86	2,048.79	(812.93)
6615008040265CB	2,573.34	3,304.26	(730.92)
6615008220449CB	1,675.95	2,647.49	(971.54)
6130004330386ZW	1,027.52	1,996.23	(968.71)
6605007544931CB	1,110.11	2,073.65	(963.54)
1680010534209WF	2,952.08	4,212.26	(1,260.18)
1560005601396LK	3,740.32	4,710.74	(970.42)
1650004739766CB	225.47	1,544.48	(1,319.01)
1560010450500WF	621.38	2,097.04	(1,475.66)
1560005616427LK	1,619.12	2,906.80	(1,287.68)
1560007006978LK	1,675.95	3,199.57	(1,523.62)
6105009829273UH	1,884.64	3,462.77	(1,578.13)
6680011708405	2,062.85	3,916.51	(1,853.66)
1620008913685	8,726.11	10,068.11	(1,342.00)
1560004752012BX	2,666.94	5,300.56	(2,633.62)
6115011065494LK	2,107.48	5,861.34	(3,753.86)
6610000154382CB	11,990.89	15,294.82	(3,303.93)
1730010893872	1,808.05	6,187.77	(4,379.72)
6615007665804CB	7,380.64	12,637.63	(5,256.99)
1650010553555	830.96	8,069.07	(7,238.11)
1560001604535LK	2,371.55	21,374.27	(19,002.72)
1610000058685	43,573.86	87,660.13	(44,086.27)
Total Difference			(111,083.84)
Average Difference			(379.13)

Appendix E: Total FMS Unit Price And Total NIPARS Unit Price for Pairs Matched by NSN

NSN	Total FMS Unit Price	Total NIPARS Unit Price	Difference
1270009965887CB	3,801.13	1,942.89	1,858.24
1620004820018	2,261.87	410.99	1,850.88
1560004553815LK	10,413.00	8,804.62	1,608.38
6130000566718	9,116.45	7,793.82	1,322.63
1560005103677LC	4,150.50	2,906.24	1,244.26
6605009380182CB	10,278.25	9,407.90	870.35
1560004739292LK	5,330.71	4,860.55	470.16
1650000225100CB	1,582.34	1,094.88	487.46
1660005616843CB	2,713.53	2,294.89	418.64
2840011826214PT	459.57	211.90	247.67
6615008852380CB	1,772.06	1,550.08	221.98
1560008628533LK	696.49	462.81	233.68
1680008767878CB	532.03	329.10	202.93
1560003410141LK	426.61	238.38	188.23
1560008315522LK	289.86	83.04	206.82
2810006148713PB	331.57	181.50	150.07
1630009128133	547.85	395.50	152.35
5999012843317XY	488.60	427.58	61.02
1560008971409LK	258.65	151.79	106.86
2810003108991PB	134.61	47.19	87.42
3010007309837CB	230.37	195.28	35.09
1650000197588CB	471.68	428.60	43.08
1620000724995	602.86	637.18	(34.32)
6615008852364CB	1,301.53	1,272.53	29.00
1650008322281CB	441.84	439.18	2.66
1560006034692LK	151.41	105.31	46.10
6210012858609XY	62.24	61.49	0.75
5910012848732XY	62.34	122.26	(59.92)
5999012845239XY	237.62	194.15	43.47
5962012851176XY	284.19	240.15	44.04
5999012862621XY	220.16	197.47	22.69
2810001188821PD	250.87	308.97	(58.10)
1650004738791CB	99.41	62.67	36.74
6760012862521XY	47.99	61.56	(13.57)
1560007305284LK	203.44	166.29	37.15
1660008315304CB	896.85	945.52	(48.67)
2810001189026PD	175.59	149.72	25.87
5999012863805XY	43.50	60.87	(17.37)
5340012838804XY	141.88	116.83	25.05
5999012845202XY	45.26	122.79	(77.53)

NSN	Total FMS Unit Price	Total NIPARS Unit Price	Difference
5895012845205XY	127.89	106.57	21.32
1560007056466GB	48.87	23.82	25.05
5895012843185XY	120.05	100.81	19.24
5340011244711LE	178.54	191.08	(12.54)
1650004739247CB	179.60	168.72	10.88
5999012871104XY	131.10	115.85	15.25
5820012853612XY	153.10	137.62	15.48
1610003888892	109.62	83.17	26.45
5895012843161XY	93.41	81.26	12.15
1650004739261CB	166.40	158.00	8.40
5340012850909XY	59.57	52.77	6.80
5340012850873XY	39.49	72.37	(32.88)
2915009070529PL	278.51	262.55	15.96
1560001224600DC	65.12	70.49	(5.37)
5820013021190XY	100.10	91.53	8.57
5950012858510XY	99.52	94.88	4.64
1560003373540LK	201.98	211.67	(9.69)
1650004738471CB	402.69	393.35	9.34
5895012845206XY	59.29	51.31	7.98
5910012850910XY	25.12	125.09	(99.97)
5961012827464XY	20.83	14.61	6.22
5935012843221XY	20.99	122.44	(101.45)
5340012858467XY	26.54	20.98	5.56
5910012852153XY	20.77	122.26	(101.49)
5340012858554XY	22.20	13.48	8.72
5961012845231XY	20.74	122.53	(101.79)
1560000463794DC	31.32	30.40	0.92
5930012782469XY	48.49	46.27	2.22
1560006541204LK	67.36	144.29	(76.93)
1650004739218CB	326.98	345.76	(18.78)
1660005601359CB	1,832.70	1,856.09	(23.39)
1270008878574CB	152.30	191.73	(39.43)
1560001227391LC	75.25	121.56	(46.31)
1560010772200WF	140.90	187.85	(46.95)
1650004739564CB	70.50	59.33	11.17
5998012858654XY	28.50	33.77	(5.27)
2810007864546PB	88.91	93.03	(4.12)
5999012862413XY	39.40	39.28	0.12
1560005701077LK	117.16	122.78	(5.62)
5945012845190XY	55.48	55.91	(0.43)
4820004739219CB	143.05	141.92	1.13
5999012864254XY	123.61	128.32	(4.71)
1560006258312LK	44.58	35.11	9.47
4920010704380WF	248.02	244.34	3.68
5905012845189XY	22.56	24.52	(1.96)

NSN	Total FMS Unit Price	Total NIPARS Unit Price	Difference
5998012858653XY	28.52	38.02	(9.50)
5905012838842XY	11.16	21.20	(10.04)
5962012570345XY	30.02	25.58	4.44
5340012850879XY	19.34	20.33	(0.99)
5330010470704CB	40.55	42.15	(1.60)
5340012851022XY	12.96	13.92	(0.96)
3120000489108PB	36.17	43.40	(7.23)
5905012855358XY	11.03	7.67	3.36
5905012855362XY	10.24	7.22	3.02
6685006513385	44.19	142.60	(98.41)
5355012850937XY	9.32	5.87	3.45
5330005155745LC	22.18	17.48	4.70
5910012863771XY	15.81	13.35	2.46
5950012845236XY	15.51	21.07	(5.56)
4010002307395LK	69.97	126.91	(56.94)
6110012845200XY	64.18	70.33	(6.15)
1560006506833LK	46.96	49.28	(2.32)
5340012850878XY	22.60	26.16	(3.56)
5961012843259XY	10.19	70.21	(60.02)
5340012855281XY	15.86	19.14	(3.28)
5962012827475XY	8.10	14.96	(6.86)
5930012858501XY	9.61	8.29	1.32
5340012838835XY	8.14	15.40	(7.26)
5999012850872XY	23.07	32.03	(8.96)
1560005456570LK	29.96	28.88	1.08
5962012827470XY	5.68	13.81	(8.13)
5905012855360XY	6.55	121.64	(115.09)
1560006113817LK	36.17	40.52	(4.35)
5905012855359XY	6.51	121.64	(115.13)
5905012855357XY	6.45	121.64	(115.19)
5905012855361XY	6.45	121.64	(115.19)
2810003108935PB	80.01	82.67	(2.66)
5910012848730XY	7.49	9.16	(1.67)
5910012855302XY	5.80	4.98	0.82
5305012876035XY	6.48	122.00	(115.52)
5910012848728XY	6.15	8.10	(1.95)
2810005129725PB	30.48	30.67	(0.19)
5961012852178XY	5.97	41.52	(35.55)
5930006106330LK	249.49	277.16	(27.67)
1560003283031LK	515.51	548.56	(33.05)
5965012863812XY	12.18	21.00	(8.82)
5910012848727XY	5.50	7.92	(2.42)
6615008315803CB	20.87	19.99	0.88
6150012855315XY	13.62	29.70	(16.08)
1560006504121LK	27.01	31.52	(4.51)

NSN	Total FMS Unit Price	Total NIPARS Unit Price	Difference
5910012863772XY	4.47	5.81	(1.34)
6695008102708CB	207.60	253.54	(45.94)
5905012855356XY	6.63	63.26	(56.63)
5961012852172XY	4.52	11.09	(6.57)
5905012862453XY	6.73	123.59	(116.86)
5962012852189XY	17.05	19.01	(1.96)
2810001189413PD	5.76	8.33	(2.57)
6145012843223XY	8.91	19.56	(10.65)
6145012838815XY	6.26	17.00	(10.74)
5961012852173XY	4.47	5.29	(0.82)
5999012852151XY	14.83	23.07	(8.24)
5961012855408XY	8.31	15.87	(7.56)
5961012843260XY	4.47	8.81	(4.34)
5910012843166XY	6.90	124.83	(117.93)
6145012838816XY	6.32	17.35	(11.03)
5961012845232XY	3.27	7.92	(4.65)
5910012859454XY	4.35	9.16	(4.81)
1650004738792CB	100.66	108.88	(8.22)
5330005315920LC	1.16	2.55	(1.39)
5306003695856PT	3.62	14.26	(10.64)
4720005419276	9.73	18.10	(8.37)
4730008981273LK	64.97	96.71	(31.74)
2810004399830PD	6.17	7.46	(1.29)
2810003108980PB	104.71	127.06	(22.35)
1560007305482LK	11.87	24.05	(12.18)
5330005850801LK	10.55	17.98	(7.43)
5340010575505PT	2.23	7.24	(5.01)
3120004783848RD	40.21	52.41	(12.20)
1560006761357LK	6.99	21.45	(14.46)
1560006258305LK	3.99	71.63	(67.64)
4010009433499LK	102.29	116.85	(14.56)
5330ND819142PXT	1.19	19.40	(18.21)
5330ND819145PXT	1.19	19.40	(18.21)
5330ND819143PXT	1.19	19.40	(18.21)
6610008767788CB	122.37	191.70	(69.33)
1560006904106LK	17.27	32.91	(15.64)
4010008697823LK	114.40	140.19	(25.79)
1560002226976RD	30.05	48.95	(18.90)
1560005328454LK	79.50	98.00	(18.50)
1560005209038LC	54.38	122.67	(68.29)
5940001400587CB	48.96	79.23	(30.27)
5330003287783LK	9.99	22.68	(12.69)
1560003367520LK	6.36	21.83	(15.47)
2995008720237XV	244.70	310.60	(65.90)
1560003385271LK	17.90	45.21	(27.31)

NSN	Total FMS Unit Price	Total NIPARS Unit Price	Difference
1005005120608	15.15	39.13	(23.98)
1680008322194CB	450.11	498.61	(48.50)
1560003406177LK	215.94	245.23	(29.29)
1560005616470LK	71.50	93.53	(22.03)
5330005313037LK	9.07	28.27	(19.20)
2810001182420PD	79.47	138.43	(58.96)
1560005347246LK	119.37	146.91	(27.54)
5910012863778XY	6.25	144.98	(138.73)
5330005314765LK	12.79	34.07	(21.28)
1560007039264LK	5.54	44.71	(39.17)
6685007949187CB	3,408.90	3,491.32	(82.42)
2810007704694PB	18.77	51.50	(32.73)
5330009617983CB	19.61	50.19	(30.58)
5915012843181XY	6.16	45.83	(39.67)
6685011358557CB	17.93	87.66	(69.73)
1560005945551LK	93.13	155.23	(62.10)
3040009914521CB	301.43	382.02	(80.59)
1560005114836LK	78.49	204.47	(125.98)
1650004738496CB	117.34	235.97	(118.63)
1680012801259WF	141.50	272.35	(130.85)
1650004738474CB	24.81	87.20	(62.39)
1560004486189RD	36.79	83.59	(46.80)
1560000347619LK	197.08	257.91	(60.83)
1560003971196RD	268.19	337.35	(69.16)
1650004739241CB	813.86	885.12	(71.26)
6220005560697	54.26	99.15	(44.89)
2915000770054PL	97.86	146.25	(48.39)
1560003259529RD	152.53	207.12	(54.59)
1650004730544CB	367.96	460.35	(92.39)
1560009944153LK	150.98	217.64	(66.66)
5330ND819147PXT	14.48	94.20	(79.72)
1560000034531RD	235.50	323.02	(87.52)
3020005281260AZ	821.94	905.91	(83.97)
1560011031966WF	118.66	177.78	(59.12)
5360006511736RD	4.89	83.80	(78.91)
1650010138164LK	200.37	283.12	(82.75)
6685007563137CB	500.37	724.87	(224.50)
1650008628488CB	269.48	384.21	(114.73)
6115008873177CB	117.07	211.56	(94.49)
1560000256067RD	124.84	220.27	(95.43)
1560003409953LK	68.43	167.50	(99.07)
3020008259219CB	106.99	190.36	(83.37)
6130005646461CB	4,617.17	5,198.95	(581.78)
1560006052640LK	252.69	380.01	(127.32)
1560002194518RD	39.31	141.73	(102.42)

NSN	Total FMS Unit Price	Total NIPARS Unit Price	Difference
5340003410130LK	28.79	216.79	(188.00)
5975000229562	59.02	162.85	(103.83)
6610008529636LK	1,323.04	1,499.16	(176.12)
1630009636219CB	53.13	161.89	(108.76)
1560006318518LK	10.76	209.88	(199.12)
1560010772199WF	65.35	207.61	(142.26)
6610006906376CB	241.28	409.44	(168.16)
1560005332589LK	261.95	387.83	(125.88)
1560008752908LK	150.88	276.72	(125.84)
1560001898324LC	80.59	263.14	(182.55)
1560005168732RD	113.88	260.73	(146.85)
6240013193699XY	96.01	340.45	(244.44)
6220006552078	54.38	204.82	(150.44)
1560000293882RD	66.57	211.37	(144.80)
4730007041652LK	159.95	336.65	(176.70)
1680007082476	325.88	512.48	(186.60)
5340003410078LK	175.37	386.33	(210.96)
1560000735998LK	1,953.21	2,174.38	(221.17)
1680007109749	104.16	309.60	(205.44)
3040001092975RD	93.10	296.21	(203.11)
6605009618145CB	130.96	331.27	(200.31)
1270007167623CB	771.66	988.60	(216.94)
6105009275039BD	207.31	422.60	(215.29)
3020000458195AZ	159.71	435.89	(276.18)
6625010160965	895.25	1,227.79	(332.54)
1680008175916CB	791.25	1,079.75	(288.50)
1560006052642LK	151.77	422.80	(271.03)
1560012729639WF	68.84	390.32	(321.48)
2915010924448	1,009.28	1,374.82	(365.54)
1650009780195CB	1,098.40	1,379.67	(281.27)
1560007657643LK	267.42	614.74	(347.32)
6130008907733CB	1,507.15	1,855.87	(348.72)
1620004739371XW	297.64	658.84	(361.20)
5950008645198LK	160.41	536.75	(376.34)
1560001093693RD	294.56	650.32	(355.76)
2915005625507PL	160.27	538.60	(378.33)
1560007657642LK	284.60	751.94	(467.34)
5905008743084CB	835.56	1,325.54	(489.98)
1650008628468CB	1,382.00	1,935.94	(553.94)
1670007970137LG	650.64	1,271.90	(621.26)
1680001795314	969.10	1,566.42	(597.32)
1560000089742LK	3,553.67	4,376.54	(822.87)
1560004203199LK	4,302.09	5,022.23	(720.14)
1680008322193CB	971.06	1,690.33	(719.27)
1660007305761CB	2,533.22	3,296.85	(763.63)

NSN	Total FMS Unit Price	Total NIPARS Unit Price	Difference
1680004546086	226.25	1,027.36	(801.11)
2810007226702PB	973.83	1,828.30	(854.47)
5895002393841CB	754.96	1,668.42	(913.46)
6610008761908CB	257.09	1,247.53	(990.44)
1650009923753CB	551.76	1,465.96	(914.20)
6615008076571CB	1,808.58	2,750.24	(941.66)
6615008040301CB	1,235.86	2,204.50	(968.64)
6615008040265CB	2,573.34	3,555.39	(982.05)
6615008220449CB	1,675.95	2,848.70	(1,172.75)
6130004330386ZW	1,027.52	2,147.94	(1,120.42)
6605007544931CB	1,110.11	2,231.24	(1,121.13)
1680010534209WF	2,952.08	4,532.39	(1,580.31)
1560005601396LK	3,740.32	5,068.76	(1,328.44)
1650004739766CB	225.47	1,661.86	(1,436.39)
1560010450500WF	621.38	2,256.42	(1,635.04)
1560005616427LK	1,619.12	3,127.72	(1,508.60)
1560007006978LK	1,675.95	3,442.74	(1,766.79)
6105009829273UH	1,884.64	3,725.94	(1,841.30)
66800[illegible]1708405	2,062.85	4,214.16	(2,151.31)
1620008913685	8,726.11	10,833.29	(2,107.18)
1560004752012BX	2,666.94	5,703.40	(3,036.46)
6115011065494LK	2,107.48	6,306.80	(4,199.32)
6610000154382CB	11,990.89	16,457.23	(4,466.34)
1730010893872	1,808.05	6,658.04	(4,849.99)
6615007665804CB	7,380.64	13,598.09	(6,217.45)
1650010553555	830.96	8,682.32	(7,851.36)
1560001604535LK	2,371.55	22,998.72	(20,627.17)
1610000058685	43,573.86	94,322.30	(50,748.44)
Total Difference			(136,500.41)
Average Difference			(465.87)

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Vita

Flight Lieutenant Susan J. Brown was born on 3 November 1962 in Traralgon, Victoria, Australia. She graduated from Traralgon High School in 1980. After graduating with a Bachelor of Economics from Latrobe University, Susan received a Commission in the Royal Australian Air Force (RAAF) on 29 June 1984. As a Supply Officer, she served her first tour of duty at RAAF Base Richmond where she was employed as a Stores Accounting Officer, followed by assignment as the Officers Mess Manager and finally, the Duty Airmovements Officer. In 1988, she was posted to RAAF Base Fairbairn as the Senior Airmovements Officer. During her tour of duty, Susan completed a Bachelor of Arts degree (majoring in English Literature) at the Australian National University. She completed her tour of duty as the Senior Stores Officer before being assigned to Headquarters Logistics Command (HQLC), Melbourne. At HQLC, she was employed as the Foreign Military Sales Financial Manager for Support Office 2 (SPTO2). While posted to Melbourne, Susan commenced a Bachelor of Letters with Honours at Melbourne University; however, this study was deferred in February 1992 when Susan was assigned to undertake a masters degree program at the United States Air Force Institute of Technology (AFIT). After completion of AFIT Susan will return as a Squadron Leader to the office of SPTO2 where she will be employed as the SPTO2 Executive Officer. At this time, Susan will recommence her academic study at Melbourne University.

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13. ABSTRACT *(Maximum 200 words)*

In a world climate of declining defence budgets and contracting force structures, there is an increasing requirement for Australia to ensure value for money when undertaking defence purchases. Cognisant of this increasing financial pressure, the purpose of this thesis is to research the NIPARS program and determine the degree to which it provides Australia and other FMS customers value for money in the field of nonstandard parts procurement.

The research problem of this thesis was identified by the Royal Australian Airforce (RAAF) Supply Liaison Officer at WPAFB. The RAAF had participated in the NIPARS program for twelve months without feed back regarding the lead time and cost performance of the NIPARS program This study analysed seven variables to asses the efficacy of NIPARS compared to previous methods used to provide nonstandard support; Procurement Administrative Lead Time, Production Lead Time, Total Procurement Lead Time, unit price, unit price inclusive of NIPARS charges and total unit price. The results of this analysis indicates that NIPARS lead time performance is superior; however, NIPARS unit cost performance is generally inferior to previous nonstandard procurement methods.

14. SUBJECT TERMS

Nonstandard Parts, Procurement, Spare Parts, Foreign Aid, Logistics, Acquisition

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